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云南乌头属一些种类的修订*

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Taxonomic notes on some species of *Aconitum* L. (Ranunculaceae) from Yunnan, China

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Abstract In this paper, some species of *Aconitum* L. (Ranunculaceae) from Yunnan are taxonomically revised. Twenty-seven species, twenty-three varieties and three forms are reduced to synonyms; the specific status of *A. fengii* is restored, and one variety, *A. fengii* var. *crispulum* Q. E. Yang is described as new.

Key words *Aconitum* L.; Taxonomic revision; Yunnan; China

摘要 对云南乌头属部分种类进行了分类修订。将 27 种、23 变种和 3 变型降为异名;冯氏乌头的种的等级得到恢复;描述了 1 个新变种,即曲毛冯氏乌头。

关键词 乌头属; 分类修订; 云南; 中国

自 1987 年以来,我对云南乌头属植物进行了多次较详细的野外考察,结合标本室研究,发现一些种类中存在或多或少的分类问题。本文对这些问题进行了力所能及的订正。必须指出的是,由于乌头属植物的变异确实十分复杂,所以本文的分类处理也只是初步的。种类的排列顺序基本上按照王文采教授的系统(王文采,1979)。所引证的标本,其存放的标本室的代号如下:中国科学院植物研究所标本馆(PE);四川大学生物系植物标本室(SZ);云南大学生态地植物学研究所植物标本室(YUNU);英国爱丁堡皇家植物园标本馆(E);英国丘皇家植物园标本馆(K);法国巴黎自然历史博物馆显花植物标本室(P)。凡未具体注明存放地点者,均藏于中国科学院昆明植物研究所标本馆(KUN)。

The genus *Aconitum* L. (Ranunculaceae) is very richly represented in Yunnan, particularly in its northwestern region. Since 1987, I have made several intensive field observations there on this genus and examined many herbarium specimens concerned. As a result, I found that there exist more or less taxonomic problems in some species. This paper is intended to clear up a certain amount of the confusion in which the species have been involved. I am nevertheless quite aware of the preliminary nature of my work, for species of *Aconitum* are often so extremely variable that actually there are no criteria by which they can be clearly defined, as emphasized by Tamura (1995). Since a pursuit of the systematic arrangement of the species under study is beyond the scope of the present paper, they are arranged basically following the system proposed by Professor W. T. Wang in 1979 in Flora Reipublicae Popu-

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laris Sinicae, Vol. 27, although sometimes with minor adjustments. All the specimens cited, unless otherwise indicated, are deposited in the Herbarium of Kunming Institute of Botany, the Chinese Academy of Sciences, Kunming, Yunnan, China (KUN). The other herbaria, from which specimens were borrowed or where specimens were examined, are as follows: Herbarium, Institute of Botany, the Chinese Academy of Sciences, Beijing, China (PE); Herbarium, Department of Biology, Sichuan University, Chengdu, Sichuan, China (SZ); Herbarium, Institute of Ecology and Geobotany, Yunnan University, Kunming, Yunnan, China (YUNU); Herbarium, Royal Botanic Garden, Edinburgh, Great Britain (E); The Herbarium, Royal Botanic Gardens, Kew, Great Britain (K); Laboratoire de Phanérogamie, Muséum National d'Histoire Naturelle, Paris, France (P).

乌头属 Aconitum L.

牛扁亚属 subgen. **Lycoctonum** (DC.) Peterm.

1. **花葶乌头**

A. scaposum Franch. in Morot. Journ. Bot. 8: 277. 1894; Hand.-Mazz. in Acta Hort. Gotob. 13: 78. 1939; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 60. 1965; Icon. Corm. Sin. 1: 686, f. 1372. 1972; W. T. Wang in Fl. Reip. Pop. Sin. 27: 162, pl. 27, f. 1~6. 1979; Lauener et Tamura in Not. Bot. Gard. Edinb. 37: 119, f. 1a. 1978. TYPE: China. Chengkou, Sichuan, Farges 116 (holotype, P; isotype, K).

A. vaginatum Pritz. in Bot. Jahrb. 29: 328. 1900; Hand. -Mazz. in Acta Hort. Gotob. 13: 78. 1939; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 60. 1965; Icon. Corm. Sin. 1: 686, f. 1371. 1972. —— *A. scaposum* var. *vaginatum* (Pritz.) Rapaics in Növ. Közl. 6: 168. 1907; W. T. Wang in Fl. Reip. Pop. Sin. 27: 164, pl. 27, f. 10~12. 1979. TYPE: China. Nanchuan, Sichuan, Bock & von Rosthorn 905 (lectotype, designated by Lauener & Tamura in l.c., n.v.).

A. cavaleriei Lévl. et Vant. in Bull. Soc. Agr. Sarthe 60: 78. 1905; Hand. - Mazz. in Acta Hort. Gotob. 13: 79. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 192. 1950; Lauener et Tamura in Not. Bot. Gard. Edinb. 37: 121. 1978; W. T. Wang in Fl. Reip. Pop. Sin. 27: 165. 1979, syn. nov. TYPE: China. Pinfa, Guizhou, Cavalerie 708 (holotype, E; isotype, K).

A. scaposum var. *hupehanum* Rapaics in l.c.; W. T. Wang in Fl. Reip. Pop. Sin. 27: 164, pl. 27, f. 7~9. 1979. TYPE: China. Hubei (n.v.).

A. jucundum Diels in Not. Bot. Gard. Edinb. 5: 266. 1912; Hand. -Mazz. in Acta. Hort. Gotob. 13: 78. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 192, pl. 266, f. 8. 1950; Lauener et Green in Not. Bot. Gard. Edinb. 23: 576. 1961; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 60. 1965. TYPE: China. Dali, Yunnan, G. Forrest 4369 (holotype, E).

A. chloranthum Hand.-Mazz. in Sitzgsanz. Akad. Wiss. Wien Math. -Nat. Kl. 60: 134. 1923. —— *A. jucundum* var. *chloranthum* (Hand. -Mazz.) Hand. -Mazz., Symb. Sin. 7: 282. 1931; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 193. 1950. —— *A. scaposum* var. *chloranthum* (Hand. -Mazz.) Lauener et Tamura in Not. Bot.

Gard. Edinb. 37: 121. 1978, syn. nov. TYPE: China. Mekong and Yangtze (Jinshajiang River) divide, NW Yunnan, Handel-Mazzetti 7909 (isotype, E).

A. vaginatum var. *xanthanthum* Hand. -Mazz. in Acta Hort. Gotob. 13: 77. 1939. —— TYPE: China. Wenchuan, Sichuan, Wilson 1033 (holotype, n.v.).

A. aggregatifolium Chang ex W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 60. 1965; Lauener et Tamura in Not. Bot. Gard. Edinb. 37: 123. 1978. —— *A. cavaleriei* var. *aggregatifolium* (Chang ex W. T. Wang) W. T. Wang in Fl. Reip. Pop. Sin. 27: 1979, syn. nov. TYPE: China. Qingchuan, Sichuan, F. T. Wang 22468 (holotype, PE).

A. scaposum var. *patentipilum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 60. 1965; Lauener et Tamura in Not. Bot. Gard. Edinb. 37: 123. 1978. TYPE: China. Yangxian, Shaanxi, H. W. Kung 3563 (holotype, PE).

Distribution (分布): Yunnan (云南), Sichuan (四川), Guizhou (贵州), Hubei (湖北), Hunan (湖南), Jiangxi (江西), Anhui (安徽), Henan (河南), Shaaxi (陕西), Gansu (甘肃), Ningxia (宁夏).

Yunnan: No precise locality (具体地点不详), G. Forrest 28528 (PE); Yiliang (奕良), NE Yunnan Division (滇东北队) 639, 698; Qiaojia (巧家), B. S. Sun (孙必兴) 1087; Zhenxiong (镇雄), H. T. Tsai (蔡希陶) 52675 (PE); Dali (大理), G. Forrest 4369 (E), 28057 (PE), Z. W. Lu (吕正伟) 1087, Q. E. Yang (杨亲二) 9420 (PE); Jingdong (景东), S. G. Xu (许朔桂) 5466; Mekong and Yangtze divide, Handel-Mazzetti 7909 (E); Weixi (维西), Q. E. Yang 98187 (PE), 98196 (PE); Deqen (德钦), K. M. Feng (冯国楣) 6380 (PE); Lanping (兰坪), H. T. Tsai 53752; Yongsheng (永胜), H. T. Tsai 51080; Gongshan (贡山), K. M. Feng 8232, T. T. Yu (俞德浚) 19435. **Sichuan**: Yanyuan (盐源), Qinhai-Xizang Exped. (青藏队) 12793; Butuo (布拖), Sichuan Econ. Pl. Exped. (四川经济植物调查队) 5850 (PE); Leibo (雷波), Z. T. Guan (管中天) 7660 (PE), 8363 (PE), 0559 (PE); Meigu (美姑), Sichuan Econ. Pl. Exped. 1363, 1460 (PE), Z. T. Guan 9133 (PE), Anonymous (采集人不详) 1761; Mianning (冕宁), S. K. Wu (武素功) 2011 (PE); Yuexi (越西), Anonymous 14042; Pingshan (屏山), Sichuan Econ. Pl. Exped. 1183 (PE); Mabian (马边), T. H. Tu (杜大华) 5504 (PE), F. T. Wang (汪发缵) 23001 (PE); Ganluo (甘洛), Anonymous 14343 (PE); Shimian (石棉), C. J. Xie (谢朝俊) 42637 (PE); Hanyuan (汉源), T. P. Wang (王作宾) 2477 (PE); Mt. Emei (峨眉山), F. T. Wang 23488, W. P. Fang *et al*. (方文培等) 33488 (PE), C. Q. Li (李彩祺) 3766, G. H. Yang (杨光辉) 57321, 57493 (PE), C. Y. Wu (吴征镒) 6368; Yaan (雅安), Nanshuibeidiao Exped. (南水北调队) 10052, 10093; Kangding (康定), C. S. Liu (刘振书) 1500 (PE), K. C. Guan (关克俭) & W. T. Wang (王文采) 417 (PE), Z. P. Huang (黄治平) 1851; Tianquan (天全), F. J. Dai (戴蕃晋) & C. M. Teng 4306, K. C. Guan & W. T. Wang 1958 (PE), 2012 (PE), 2099 (PE), 2144 (PE), W. K. Hu (胡文光) 35384 (PE); Baoxing (宝兴), C. L. Chu (曲桂龄) 3184 (PE); Danba (丹巴), The 8th Forest Management Brigade (第八

森林经理大队) 2056 (PE), 2727 (PE), 2736 (PE), 5101 (PE); Xiaojin (小金), Anonymous 9716 (PE); Lixian (理县), C. L. Wu (吴中伦) 33179 (PE), Z. He (何铸) & Z. L. Zhou (周子林) 13641 (PE), 13759 (PE), 14194 (PE); Wenchuan (汶川), K. Y. Lang *et al*. (郎楷永等) 1181; Maowen (茂汶), Anonymous 11044 (PE); Pingwu (平武), H. L. Tsiang (蒋兴麟) 10799 (PE); Qingchuan (青川), F. T. Wang 22468 (PE); Nanping (南坪), Q. X. Li (李全喜) & X. C. Zhao (赵兴存) s.n. (PE), P. C. Li (李沛琼) 218 (PE); Youyang (酉阳), S. X. Tan (谭士贤) 402 (PE); Nanchuan (南川), G. F. Li (李国凤) 53849, 64384, J. H. Xiong (熊济华) & Z. L. Zhou 92804, 92906, 93463, K. C. Guan, J. W. Wang (汪劲武) & C. L. Li (李朝銮) 2187 (PE), 2222 (PE); Fengjie (奉节), H. F. Zhou (周洪富) & H. Y. Su (粟和毅) 108515 (PE), Z. R. Zhang (张泽荣) 25452 (PE); Wuxi (巫溪), C. L. Chu 2035 (PE), G. H. Yang 59079 (PE), 59266 (PE), 65300 (PE), 65400 (PE), Y. D. Chen (陈耀东), X. T. Ma (马欣堂) & L. Z. Fu (傅连中) 2068 (PE), 2348 (PE); Chengkou (城口), Farges 116 (K); Farges s.n. (PE), T. T. Yu 2073 (PE), T. L. Dai (戴天伦) 101744, 101990, 102383, 102630, 102963, 104097, 104776, 104914, 106193, 106524, 107038, 107119 (all in PE). **Guizhou**: Yingjiang (印江), C. P. Tsien (简焯坡) 30748 (PE); Shiqian (石阡), Wulingshan Exped. (武陵山考察队) 2828; Mt. Fanjingshan (梵净山), West China's Academy of Sciences (中国西部科学院) 3721; Anlong (安龙), C. D. Li (李朝斗) 351 (PE); Ping-fa (平伐), Cavaleriei 708; Near Gan-pin (Gan-pin 附近), Martin & Bodinier 1886 (E). **Hubei**: Hefeng (鹤峰), H. J. Li (李洪钧) 6906; Badong (巴东), Hubei Bot. Exped. (鄂植考队) 24409 (PE); Zigui (秭归), T. P. Wang 12089 (PE); Xingshan (兴山), H. J. Li 670 (PE); Shenlongjia (神农架), Hubei Bot. Exped 22743 (PE), 25106 (PE), 25184 (PE), Sino-Amer. W Hubei Exped. (中美联合鄂西植物考察队) 15, 136; Fangxian (房县), A. Henry 6867 (PE); Junxian (均县), K. R. Liu (刘克荣) 0183 (PE). **Hunan**: Cili (慈利), W Hunan Exped. (湘西考察队) 413 (PE), 426 (PE); Mt. Mufushan (幕阜山), Y. G. Xiong (熊耀国) 05754 (PE). **Jiangxi**: Qianshan (铅山), Anonymous 4502 (PE); Jingan (靖安), Y. G. Xiong 1378 (PE). **Anhui**: Jinzhai (金寨), X. S. Shen (沈显生) 1639. **Henan**: Xixia (西峡), Anonymous 668 (PE); Lushi (卢氏), K. M. Liu (刘克孟) 5085 (PE); Songxian (嵩县), K. C. Guan & T. L. Dai 2353 (PE), Anonymous 34832 (PE); Shangcheng (商城), Pl. Resour. Exped. (植物资源考察队) D144377 (PE), Anonymous 310 (PE). **Shaanxi**: Huxian (户县), P. C. Kuo (郭本兆) 617 (PE), 814 (PE); Lueyang (略阳), K. T. Fu (付坤俊) 5894, 6095 (PE); Fengxian (凤县), K. M. Liou (刘继孟) 10660; Yangxian (洋县), H. W. Kung (孔宪武) 3563 (PE); Mt. Taibaishan (太白山), W. Y. Hsia (夏纬英) 31 (PE), P. C. Tsoong (钟补求) 301 (PE), T. N. Liou (刘慎谔) & P. C. Tsoong 571 (PE); Shanyang (山阳), T. P. Wang 16377, 16405 (PE)。**Gansu**: Wenxian (文县), Q. E. Yang 9215 (PE); Kangxian (康县), Z. Y. Zhang (张志英) 17313 (PE); Tianshui (天水), K. M. Liou 10415 (PE); Pingliang (平凉), Yellow River Exped. (黄河队) 2066 (PE), T. P.

Wang 13346 (PE). **Ningxia**: Guyuan (固原), T. P. Wang 17228 (PE).

本种是我国乌头属植物中分布较广而变异较大的一个种，尤其是在茎生叶与基生叶的发育方面有较大的变异。有些类型的基生叶发育，茎生叶强烈退化；有些类型茎中部以上叶密集成丛，上部叶多少退化；有些类型的茎生叶均正常发育，在茎上等距排列。但这三个类型并不是截然可分的，与地理分布也无相关性，有时同一号标本分属于不同的类型。考虑到乌头属的体态和习性受生态环境影响很大，我们同意 Lauener & Tamura (1978) 的意见，认为不宜把这三个类型划分为不同的变种。

所谓的黔川乌头 *A. cavaleriei* Lévl. et Vant. 及聚叶黔川乌头 *A. cavaleriei* var. *aggregatifolium* (Chang ex W. T. Wang) W. T. Wang 与本种在形态上很难区分，应予归并。聚叶黔川乌头产于四川北部的青川县，该变种实际上与产于邻近地区如甘肃文县等地的花亭乌头没有明显区别；从分布区上来说，将其处理为黔川乌头的变种显然也是不合理的。

本种的花通常为蓝紫色，但有时为黄色，如上引维西的标本。

This is one of the most widely distributed species of *Aconitum* in China and shows great morphological variation, particularly in the development of basal and cauline leaves. In some plants the basal leaves are highly developed with the cauline leaves being obsolete, whereas in others all the leaves are nearly aggregated in the middle part of the stem, and yet in others both the basal and cauline leaves are equally developed, with the cauline leaves being nearly equally distantly arranged along the stem. The variation, however, is irregular and not correlated with geographical distribution or habitats, so the three types cannot always be distinctly distinguished; sometimes different sheets of a specimen of the same number are referable to this or the other type. Therefore I agree with Lauener and Tamura (1978) in not treating them as different varieties.

A. cavaleriei Lévl. et Vant. and its variety, var. *aggregatifolium* (Chang ex W. T. Wang) W. T. Wang, are morphologically indistinguishable from *A. scaposum*, and thus are here both relegated to synonyms of *A. scaposum*. Even from their geographical distribution, it is far from understandable that var. *aggregatifolium* was treated as a variety of *A. cavaleriei*. The holotype of var. *aggregatifolium*, which was collected from northern Sichuan's Qingchuan County, shows no morphological difference from the plants of *A. scaposum* from the adjacent areas of Qingchuan, such as southern Gansu's Wenxian County, whereas the so-called *A. cavaleriei* is usually considered to be distributed in Guizhou and eastern Sichuan. Hence, even if var. *aggregatifolium* could be recognized as a taxonomic entity, from a morpho-geographical view it would be more acceptable to put it under *A. scaposum* than under *A. aggregatifolium*. This further indicates that indeed *A. cavaleriei* cannot be distinguished from *A. scaposum*.

The flowers of this species are usually purple or blue, but sometimes, as found in the plants from Weixi, are yellow.

2. 粗花乌头

A. crassiflorum Hand. -Mazz. Symb. Sin. 7: 283, t. 6, f. 3. 1931 et in Acta Hort.

Gotob. 13: 82. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 200. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 60. 1965; Ic. Corm. Sin. 1: 687, f. 1373. 1972; Lauener et Tamura in Not. Bot. Gard. Edinb. 37: 123. 1978; W. T. Wang in Fl. Reip. Pop. Sin. 27: 165, pl. 25, f. 7~8. 1979. TYPE: China. Zhongdian, Yunnan, Handel-Mazzetti 4487 (holotype, n. v.); same locality, Handel-Mazzetti 7691 (paratype, E; photo, PE).

A. wardii Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 188, pl. 246, f. 17. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 168. 1979; Tamura et Lauener in Not. Bot. Gard. Edinb. 37: 454. 1979, p. p., excl. syn. *A. leucostomum* Worosh., syn. nov. TYPE: China. Muli, Sichuan, Kindon Ward 4825 (holotype, E; isotype, K); no precise locality, W Yunnan, China, G. Forrest 28788 (paratype, E; isoparatype, PE).

A. wardii var. *trisectum* W. T. Wang et L. Q. Li in Acta Phytotax. Sin. 25: 25, pl. 1, f. 1. 1987, syn. nov. TYPE: China. Yajiang, Sichuan, K. Y. Lang, Y. Fei & L. Q. Li 2866 (holotype, PE; isotype, KUN).

A. kialense W. T. Wang in Acta Bot. Yunnan. 15: 347. 1993, syn. nov. TYPE: China. Kangding, Sichuan, J. A. Soulie 394 (holotype, P).

A. brevicalcaratum auct. non (Finet et Gagnep.) Diels: W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 59. 1965, p. p., quoad Pl. Zhongdian. et Weixi.; et in Fl. Reip. Pop. Sin. 27: 165. 1979, p. p., quoad Pl. Zhongdian. et Weixi.; et in Guihaia 17: 11. 1997.

Distribution: NW Yunnan, SW Sichuan.

Yunnan: northwest, no precise locality, G. Forrest 28788 (PE); Lijiang (丽江), Y. Z. Zhao (赵裕章) 21273; Zhongdian (中甸), Handel-Mazzetti 7691 (E; photo, PE), T. T. Yu 12976, 12581 (PE), 12458 (PE), K. M. Feng 23278, 2010 (PE), 1904, 2461, S. W. Yu (俞绍文) 62005, Zhongdian Division (中甸队) 965 (PE), 2027 (PE), 63-3367, 63-3385, J. S. Yang (杨竞生) 8213, Beijing Inst. Bot. Hengduanshan Mt. Exped. (北京所横断山队) 2810 (PE), Q. E. Yang 8901, 8909, 8912; Deqen, J. S. Yang 8595 (PE), Q. E. Yang 8919, 8921; Weixi, C. W. Wang (王启无) 68469, 64498 (PE), Q. E. Yang, 98443 (PE). **Sichuan**: Dukou (渡口), Qinghai-Xizang Exped. 11253; Muli (木里), Kindon Ward 4825 (E; K; photo, PE), S. K. Wu 2610, L. H. Liu *et al*. (刘伦辉等) s. n. (PE), Qinghai-Xizang Exped. 14035, 14291, 13253 (PE), Q. E. Yang 9318 (PE); Daocheng (稻城), Sichuan Veg. Exped. (四川植被调查队) 2583; Daofu (道孚), Anonymous 5904 (PE); Yajiang (雅江), K. Y. Lang, L. Q. Li (李良千) & Y. Fei (费勇) 2866 (PE; KUN), 2934 (PE), 2980, Y. B. Luo (罗毅波) 95 (PE); Kangding, J. A. Soulie 394 (P).

所谓的滇川乌头 *A. wardii* Fletcher et Lauener 的成立与否及其与本种的关系,长期以来都让我感到困惑。粗花乌头的模式标本 (Handel-Mazzetti 4487) 采于云南中甸, Handel-Mazzetti (1931) 最初发表本种时仅引证了上述模式标本和其它两号产于中甸的标本,但他 (1939) 又引证了产自四川木里的两号标本 (Rock 16945, 18318)。滇川乌头

的模式 (Kindon Ward 4825) 也采自四川木里,但 Fletcher & Lauener (1950) 发表它时同时引证了产自云南中甸及澜沧江和怒江分水岭一带的标本 (G. Forrest 290, 14781) 以及产于云南西部但具体地点不详的 G. Forrest 28788 号标本。奇怪的是,Tamura & Lauener (1979) 在对全世界牛扁亚属植物进行整理时,把分布于我国新疆、甘肃西北部和哈萨克斯坦的白喉乌头 *A. leucostomum* Worosh. 并入滇川乌头。我们检查了大量云南和四川西南部的有关标本,没有鉴定出滇川乌头。虽然有些木里的标本似乎符合滇川乌头的原描述,但实际上与产于中甸的粗花乌头没有区别。王文采和李良千 (1987) 又发表了滇川乌头一个新变种 —— 全裂滇川乌头 *A. wardii* var. *trisectum* W. T. Wang et L. Q. Li。该变种产于四川雅江。其主模式 (郎楷永、费勇、李良千 2866,PE) 叶三全裂,但同号模式 (KUN) 叶裂至距基部 1～1.5 cm,所以很可能这个变种只是一个极端变异类型,而且这个变种的小苞片着生于花梗的基部。但根据《中国植物志》对滇川乌头的描述,滇川乌头与粗花乌头的一个很大区别在于前者的小苞片着生于花梗下部至上部,而后者的小苞片着生于花梗基部 (在滇川乌头的原描述中没有提到小苞片的着生位置)。因此,我们认为滇川乌头这个种很有疑问,其命名人之一 Lauener 很可能也没有完全认识这个种。这个种极可能就是粗花乌头。上引杨亲二 8912 号标本来自于同一个个体 (这类植物具根状茎,有很强的营养繁殖能力,从同一根状茎上可以长出很多植株),但其小苞片的着生位置在不同植株甚至同一植株都有从基部、下部至上部的变化,只有个别植株的小苞片全部着生于基部。1997 年,我在英国丘园终于有机会检查了滇川乌头的模式,证实滇川乌头确属粗花乌头,故予以归并。

Fletcher & Lauener (1950) 发表 *A. wardii* 时,将其与短距乌头 *A. laueneriaum* Fletcher (= *A. brevicalcaratum* Finet et Gagnep. var. *brevicalcaratum*, 关于其名实问题,详见杨亲二(1994))的比较。确实,粗花乌头与短距乌头及其变种无距乌头 *A. brevicalcaratum* var. *parviflorum* Chen et Liu 在体态上颇相似,如果标本上没有花,有时不易区分。王文采教授 (1997, 1965) 引证于无距乌头这一变种之下的标本中，其中维西 (王启无 644498)、中甸 (冯国楣 2461) 的标本应属于粗花乌头。维西的标本花尚未成熟，花序没有展开，花梗显得很短。我们看到同地的标本花梗较长，花较稀疏，花瓣有较长而弯曲的距，显系粗花乌头。中甸的冯国楣 2461 号标本为一具果无花标本，果梗较长，果序稀疏,也显系粗花乌头无疑。中甸正是该种的模式产地。

有趣的是，王文采教授 (1993) 发表卡那乌头 *A. kialense* 时,也将其与短距乌头比较而未与粗花乌头比较。实际上,卡那乌头与粗花乌头没有区别。显然,由于长期以来对粗花乌头及其与短距乌头的关系认识不够深入,所以导致了 *A. wardii* 和 *A. kialense* 这样的新分类群的发表。王文采教授 (1979) 似乎过于强调了乌头属植物的花瓣的距的长短的分类和系统学价值,以至于认为短距乌头是乌头属中最原始的种之一,与粗花乌头关系较远。事实上,花瓣的构造在乌头属的极为近缘的类群中有时都有极大的变化,如钩瓣乌头 *A. hamatipetalum* W. T. Wang 和美丽乌头 *A. pulchellum* Hand. -Mazz. 明显近缘,但二者在花瓣构造上明显不同。细胞学研究表明，短距乌头及其变种无距乌头均为四倍体 (杨亲二等,1994; Yang *et al*., 1989),应当属于较为进化的种类。

粗花乌头与短距乌头的分布区基本上是重叠的，两者都为四倍体 (在牛扁亚属中四

倍体极为少见;除上述两种外,目前仅在高乌头及其变种狭盔高乌头发现有四倍体细胞型(杨亲二, 1996; 杨亲二等,1994;Yang *et al*., 1989; 商效民,李正理,1984)。Tamura (1995) 认为牛扁亚属中没有四倍体的观点是错误的),在核型上也很相似。两个种是否可以作为亚种处理,值得研究。在本文中,我们仍然把它们处理为不同的种,但我们认为两者的关系是极为相近的。Lauener & Tamura (1979) 以及 Tamura (1995) 把它们置于不同的系,而且系的位置又离得较远,明显是不妥的。

云南的3种牛扁亚属植物,即花亭乌头、短距乌头和粗花乌头在我国云南、四川横断山脉地区变异较大,在分类上长期以来存在很多混乱。我们这次通过野外观察和检查大量标本室的标本,并结合细胞学研究,应当说基本澄清了这几种植物的分类问题。其区别如下:

云南的3种牛扁亚属植物分种检索表

1. 花序下部花梗长 1.2 ~ 4 cm, 中部以上的长 0.5 ~ 3.5 cm, 花较稀疏; 花瓣的距与唇等长, 或比唇长 2 ~ 3 倍。
   2. 花序下部花梗长 2.2 ~ 4 cm, 中部以上的长 1.4 ~ 3.5 cm; 花瓣的距通常比唇长; 叶基部通常具明显的鞘 …………………………………………………… 1. **花葶乌头 A. scaposum** Franch.
   2. 花序下部花梗长 1.2 ~ 3.5 cm, 中部以上的长 0.5 ~ 1.2 cm; 花瓣的距与唇近等长; 叶基部通常不具鞘 …………………………………………………… 2. **粗花乌头 A. crassiflorum** Hand. -Mazz.
1. 花梗 (花序最下部的除外) 长 1.5 ~ 5 mm, 花通常密集; 花瓣无距或有长达 4 ~ 5 mm 的短距, 距比唇明显要短。
   3. 花瓣有 4~5 mm 的短距 ……………… 3a. **短距乌头 A. brevicalcaratum** (Finet et Gagnep.) Diels
   3. 花瓣无距 ………………………… 3b. **无距乌头 A. brevicalcaratum** var. **parviflorum** Chen et Liu

The identity of *A*. *wardii* Fletcher et Lauener and its relationship with *A*. *crassiflorum* have long been a perplexing problem for me. The type specimen of the latter (Handel-Mazzetti 4487) was collected from Zhongdian County, Yunnan. In addition to the type, Handel-Mazzetti cited other two specimens also from Zhongdian when he described *A*. *crassiflorum* in Symbolae Sinicae Ⅶ in 1931, and in his monographic work of the Chinese *Aconitum* published in Acta Hort. Gotob. in 1939, under this species he further cited two specimens (Rock 16945, 18318) from southwestern Sichuan's Muli County. The holotype of *A*. *wardii* (Kindon Ward 4825) was collected also from Muli, but when Fletcher & Lauener described this species they simultaneously cited two collections, G. Forrrest 290 and G. Forrest 14781, from Zhongdian and the Mekong-Salwin divide respectively, and another collection, G. Forrest 28788, from northwestern Yunnan but without precise locality. It seems very strange that Tamura & Lauener (1978) combined this species with *A*. *leucostomum* Worosh., a species from Xinjiang and Gansu of China, and Kazankhstan, in their new classification of the subgenus *Lycoctonum* of the world. I examined a lot of pertinent specimens from Yunnan and Sichuan, but failed to determine the identity of *A*. *wardii* with certainty. Although some collections from Muli perfectly agree with the original Latin description of *A*. *wardii*, they actually cannot be distinctly differentiated from *A*. *crassiflorum*. To make things even more complicated, W. T. Wang & L. Q. Li (1987) described as a new variety under *A*. *wardii* a plant from W Sichuan, i.e. var. *trisectum* W. T. Wang et

L. Q. Li. They stated that their new variety is different by having the leaves totally divided to the base. The holotype (K. Y. Lang, Y. Fei & L. Q. Li 2866, PE) really has such leaves, but the isotype (KUN) has leaves only deeply divided to 1～1.5 cm from the base. This indicates that this variety might only represent an extreme form in variation. Furthermore, it should be noted that the bracteoles of this variety are borne at the base of the pedicels, but according to W. T. Wang (1979), one of the important differences between *A. crassiflorum* and *A. wardii* lies in the position of their bracteoles; in the former, the bracteoles are at the base of the pedicels, whereas in the latter the bracteoles are situated from the base to the middle part of the pedicels, though in the original description of *A. wardii* the position of the bracteoles were not mentioned. Hence, I can safely say that the identity of *A. wardii* is quite doubtful. I suspect that even one of its authors, Lauener, did not recognize this species fully and it is most possibly conspecific with *A. crassiflorum*. According to my observation, the position of the bracteoles seems to be of no taxonomic significance in the two species under question. A gathering from Zhongdian cited above, Q. E. Yang 8912, includes several flowering stems from a same rhizome, but the position of the bracteoles showed great variation; they could be situated at the base, in the middle part and the upper part of the pedicels even on the same stem, not to say on different stems, and only on one stem are all the bracteoles found to be at the base of the pedicels. In 1997, I had a chance to check the isotype of *A. wardii* and other important specimens at Kew. *A. crassiflorum* and *A. wardii* are shown conclusively to be the same species.

When Fletcher & Lauener (1950) published *A. wardii*, they compared it with *A. lauenerianum* (= *A. brevicalcaratum* Finet et Gagnep. var. *brevicalcaratum*, sensu Q. E. Yang (1994)). In fact, *A. crassiflorum* is in habit very similar to *A. brevicalcaratum* and its variety, var. *parviflorum* Chen et Liu, so much so that if no flowers are present in the specimens, they are quite difficult to be distinguished from each other. Among the collections cited by W. T. Wang (1997, 1965) under *A. brevicalcaratum*, two specimens, C. W. Wang 644498 from Weixi and K. M. Feng 2461 from Zhongdian, should be actually identified as *A. crassiflorum*. The flowers of the Weixi plant are not mature and thus the inflorescence has not yet fully developed and is somewhat dense, and the pedicels appear to be very short, all these making the plant look very like *A. brevicalcaratum*. However, the mature plant from the same locality is found to have laxer inflorescence and flowers with longer pedicels, and more importantly, the petals are found to have longer and obviously coiled spurs. Therefore the plant should undoubtedly be referred to *A. crassiflorum*. The Zhongdian collection is a fruiting plant with longer fruit stalks and lax infructescence and undoubtedly should be equated with *A. crassiflorm*. As mentioned above, Zhongdian is the type locality of this species.

Very interestingly, when Professor W. T. Wang (1993) published *A. kialense*, he also compared his new species with *A. brevicalcaratum* instead of with *A. crassiflorum*. In fact, I can not find any essential difference between *A. kialense* and *A. crassiflorum*. Obviously, it is the long-term misunderstanding of the relationship between *A. brevicalcaratum* and *A. crassiflorum* in the past that has resulted in the publication of the two ill-delim-

ited species, i.e. *A. wardii* and *A. kialense*. The two species *A. crassiflorum* and *A. brevicalcaratum have long been erroneously considered to be only remotely related to each other because of the difference in their petal structure. It should be noted that Professor* W. T. Wang (1979) seemed to have attached too much importance to the systematic value of the petal structure in *Aconitum*. He considered that *A. brevicalcaratum*, which has petals without spur or with only a very short spur, should be one of the most primitive species in *Aconitum*, and thus may be very distantly related to *A. crassiflorum*, which has petals with much longer and coiled spur. Practically, in the genus *Aconitum*, the petal structure, particularly the length of the spur, may exhibit great variation within the very closely related taxa or even within the same species, so I believe that its systematic value, at least at the specific level, is rather limited for the phylogenetic considerations of this genus. Cytologically, *A. brevicalcaratum* is a tetraploid (Yang *et al.*, 1994; Yang *et al.*, 1989) and thus should be a relatively advanced species in the subgenus *Lycoctonum*.

A. crassiflorum and *A. brevicalcaratum* are overlapping in geographical distribution and both are tetraploids. In the subgenus *Lycoctonum*, tetraploidy is very rare; up to now, besides these two species under question being found to be tetraploid, only *A. sinomontanum* var. *angustius* and a population in *A. sinomontantum* var. *sinomontanum* were found to be tetraploids (Yang, 1996; Yang *et al.*,1994; Yang *et al.*, 1989; Shang, Li, 1984). Although Tamura (1995) was wrong when he claimed that there are no polyploids in the subgenus *Lycoctonum*, polyploidy is indeed very rare in this group. Thus I believe that the occurance of tetraploidy in the two species is not independent, representing cytological evidence which strongly supports the idea that they are two very closely related species and might better be treated as two subspecies, though here I have not yet done so. Anyhow, it is totally unacceptable that Lauener & Tamura (1979) and Tamura (1995) put them in different series.

The three species of the subgenus *Lycoctonum* mentioned above, i.e. *A. scaposum*, *A. crassiflorum* and *A. brevicalcaratum*, show great morphological variation in the Hengduanshan Mountains of Yunnan and Sichuan, and great confusion has long been involved in their taxonomy (See Yang (1994) for the detail on the identity of *A. brevicalcaratum*). Through intensive field and herbarium work, combined with cytological study, much of the confusion, I should say, has been cleared up here. The three species are keyed out as follows:

Key to the three species of the subgenus *Lycoctonum* in Yunnan

1. Pedicels in the lower part of the inflorescence 1.2 ~ 4 cm long, those in the middle and upper parts 0.5 ~ 3.5 cm long; inflorescence lax; spur of the petal equal to the lamina or 2~3 times longer.
   2. Pedicels in the lower part of the inflorescence 2.2 ~ 4 cm long, those in the middle and upper parts 1.4 ~ 3.5 cm long; spur of the petal usually longer than the lamina; leaves often obviously vaginate at the base ·························· 1. **A. scaposum** Franch.
   2. Pedicels in the lower part of the inflorescence 1.2 ~ 3.5 cm long, those in the middle

and upper parts 0.5 ～ 1.2 cm long; spur of the petal subequal to the lamina in length; leaves not obviously vaginate at the base ………… 2. **A. crassiflorum** Hand.-Mazz.

1. Pedicels (except for those in the lowest part of the inflorescence) 1.5～5 mm long; inflorescence dense; spur of the petal obsolete or only 4 ～ 5 mm long and obviously shorter than the lamina.
   3. Spur of the petal 4 ～ 5 mm long ………………………………………………………… 3a. **A. brevicalcaratum** (Finet et Gagnep.) Diels
   3. Spur of the petal obsolete …… 3b. **A. brevicalcaratum** var. **parviflorum** Chen et Liu

乌头亚属 —— subgen. **Aconitum**

3. **美丽乌头**

A. pulchellum Hand.-Mazz. in Sitzgsanz. Ak. Wiss. Wien. Math. -Nat. K1. 62: 219. 1925 et Symb. Sin. 7: 286. 1931 et in Acta Hort. Gotob. 13: 93. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 204. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 95. 1965; Ic. Corm. Sin. 1, 697, f. 1393. 1972; W. T. Wang in Fl. Reip. Pop. Sin. 27: 191, pl. 33, f. 5～6. 1979 et in C. Y. Wu (ed.): Fl. Xizang. 2: 24. 1985. TYPE: China. Deqen, Yunnan, Handel-Mazzetti 8074 (isotype, E).

A. handelianum Comber in Not. Bot. Gard. Edinb. 18: 224. 1934; Hand. -Mazz. in Acta Hort. Gotob. 13: 93. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 202. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 95. 1965 et in Fl. Reip. Pop. Sin. 27: 298. 1979, syn. nov. TYPE: China. Jianchuan, Yunnan, G. Forrest 22257 (holotype, E).

A. pulchellum var. *racemosum* W. T. Wang in Fl. Reip. Pop. Sin. 27, Addenda. 1979, syn. nov. TYPE: China. Deqen, Yunnan, J. S. Yang s.n. (holotype, PE)

Distribution: China: NW Yunnan, Sichuan and Xizang; Sikkim, Bhutan and N Myanmar.

Yunnan: West, no precise locality, G. Forrest 30578 (PE), 30781 (PE); Jianchuan (剑川), G. Forrest 22257 (E); Zhongdian, K. M. Feng 2182, A. L. Zhang (张敖罗) 101092, Zhongdian Division 1730, J. S. Yang 88-323 (PE), 83-397 (PE), Z. G. Qian (钱子刚) & Z. D. Fang (方震东) 0425; Deqen, Handel-Mazzetti 8074 (E), G. Forrest 13353 (PE), C. W. Wang 8922, 68929 (PE), 69043 (PE), 69581, 69644, T. T. Yu 9676 (PE), K. M. Feng 6875, 6595 (PE), J. S. Yang s.n. (PE), 8586, 8753, H. Sun (孙航) & Z. G. Qian 0805, W. M. Chu *et al*. (朱维明等) 17156 (PE), Q. E. Yang 8919, 8925, 8926; Weixi, Z. D. Fang & X. H. Li (李新华) 0367. **Sichuan**: Maerkang (马尔康), X. Li (李馨) 71797 (SZ); Muli, Qinghai-Xizang Exped. 14497, 12856; Daocheng, T. T. Yu 12832, Qinghai-Xizang Exped. 553, 5883; Xiangcheng (乡城), Qinghai-Xizang Exped. 005001, 005079; Hongyuan (红原), Anonymous 10458 (PE); Dajin (大金), X. Li 78693 (PE); between Merge and Sankar, H. Smith 4323 (PE). **Xizang** (西藏): Basu (八宿), Qinghai-Xizang Exped. 73-1156; Chayü (察隅), C. W. Wang 65630 (PE), Qinghai-Xizang Exped. 73-1196, 10203, 10624.

Myanmar (缅甸): Upper Burma, G. Forrest 27446 (PE).

本种在体态、植株高矮、花序长短及其毛被、花瓣和雄蕊的毛被等方面有较大的变化,但花的形状和构造比较稳定。所谓的剑川乌头 *A. handelianum* Comber. 和长序美丽乌头 *A. pulchellum* var. *racemosum* W. T. Wang 只不过是本种的一些较高的类型而已,它们常可以在矮小植株的居群中找到,故应归并。疏花剑川乌头 *A. handelianum* var. *laxiflorum* Hand.-Mazz. 可能也属于这种情况。但由于该变种是根据采自四川西部和西北部的6份合模式 (syntype) 发表的,我没有看到这些合模式,无法进行模式标定 (typification),故暂未处理,留待以后研究。

花瓣及雄蕊的毛被在种内的变化极无规律。采自中甸哈巴山的中甸队1730号标本,共有5个植株,雄蕊的花丝几乎都无毛,3株的花距有4~6根毛,1株只有1根毛,1株无毛。采自维西的标本(方振东和李新华0367号)共有3个植株,花丝被较密的毛,花瓣的瓣片、爪、距有稀疏的毛。因此,在不同居群之间或同一居群之内,花丝、花瓣的毛的多少及有无都有变化,不宜再据此划分种下分类群。

This species shows great variation in the habit, the height of the plant, the length and indumentum of the inflorescence, and the hairiness of the stamens and of the petals, but is relatively constant in the shape and structure of the flowers. *A. handelianum* Comber and *A. pulchellum* var. *racemosum* W. T. Wang may only represent the higher type of plants in this species and such type can often be found to grow in the same population together with the dwarf type. *A. handelianum* var. *laxiflorum* Hand.-Mazz. may also only belong to the higher type of this species. This variety was described based on six syntypes from western and northwestern Sichuan, none of which I have a chance to check, so it is out of the question to carry out a correct typification and I have to set it aside for the future study.

The hairiness of the petal and of the stamen shows quite irregular changes even within the same population. One Zhongdian collection cited above, Zhongdian Division 1730, includes five individual plants, the stamens of which are all glabrous, the petals of three plants have 4~6 hairs on the spur, and those of one plant have only one hair on the spur, and those of the remaining one are glabrous. The Weixi collection, Z. D. Fang & X. H. Li 0367, includes three plant individuals, the stamens of which are relatively densely hairy on the filaments and the petals are sparsely hairy on the lamina, the spur and the claw of the petals. Therefore, the hairiness of the stamens and of the petals in this species is of great variation between and within the populations, it is not appropriate to establish infraspecific taxa based on this character.

4. 保山乌头

A. nagarum Stapf in Ann. Bot. Gard. Calc. 10: 176, pl. 113. 1905; Hand.-Mazz. in Acta Hort. Gotob. 13: 89. 1939; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 93. 1965 et in Fl. Reip. Pop. Sin. 27: 193. 1979. TYPE: India. Japvo Mountains, District Kohima, C. B. Clarke 41332A (holotype, K).

A. ventorium Diels in Not. Bot. Gard. Edinb. 5: 269. 1912. TYPE: China. Mekong-Irrawadi divide, NW Yunnan, G. Forrest 826 (lectotype, designated here, E).

A. *venetorium* var. *ecalcaratum* Airy-Shaw in Kew Bull. 1932: 245. 1932. —— *A*. *nagarum* var. *ecalcaratum* (Airy-Shaw) Airy-Shaw in Kew. Bull. 1935: 579. 1935. —— *A*. *nagarum* f. *ecalcaratum* (Airy-Shaw) W. T. Wang in Fl. Reip. Pop. Sin. 27: 194. 1979, syn. nov. TYPE: China. Tengchong, Yunnan, G. Forrest 25996 (lectotype, designated here, E).

4a. 保山乌头　原变种

var. **nagarum**

Distributuin: China: Yunnan; N Myanmar and NE India.

Yunnan: Yunlong (云龙), F. G. Pan (潘福根) 8402; Baoshan (保山), C. Chen (陈介) 163, S. P. Yu (于世平) 62014 (PE), R. Y. He (何仁远) 62008 (PE), 62009 (PE), 62010 (PE), J. S. Yang 01344; Mekong-Irrawadi divide, G. Forrest 826 (E); Tengchong (腾冲), G. Forrest 25996 (E), 27390 (PE), D. M. Zhang (张大明) 89259, J. Zhou (周俊) s. n.; Lushui (泸水), S. K. Wu 8381, Bijiang Division (碧江队) 1783, D. M. Zhang s. n.

Myanmar: Upper Burma, G. Forrest 27444 (PE).

本变种在花瓣的距的长短及弯曲程度上有一定变异,但情形与短距乌头及其变种无距乌头不同。短距乌头的花瓣有明显向后弯的短距,无距乌头的花瓣没有明显的距。但本种植物的花瓣都有距,只是向后弯的程度不同。有些植物的距直,有些稍向后弯,有些后弯得更明显一些。所以我们认为不宜将这些类型分开。

本变种在心皮毛被上有一定变化。上引周俊无号标本的心皮无毛或有稀疏毛。

This variety shows some variation in the length and curvature degree of the spur of the petal, but the situation is different from that in *A*. *brevicalcaratum*, a species in which the typical variety has the petal with a 4～5 mm long spur obviously bent backwards, while the variety var. *parviflorum* Chen et Liu has spurless petals. In this and the following variety, the petals are all provided with a short spur, though the curvature degree of the spur has some variation; in some plants the spur is erect while in others the spur is more or less bent backwards. I believe that, therefore, the plants with petals of different curvature degree of the spur should not be recognized as independent taxa.

This variety shows also some variation in the hairiness of carpels. The carpels are usually covered with dense hairs, but a Tongchuan collection cited above, J. Zhou s. n. has carpels glabrous or only sparsely hairy.

4b. 小白撑　变种

var. **acaule** (Finet et Gagnep.) Q. E. Yang, comb. nov. —— *A*. *napellus* var. *acaule* Fint et Gagnep. in Bull. Soc. Bot. Fr. 51: 512. 1904. —— *A*. *acaule* (Finet et Gagnep.) Diels in Not. Bot. Gard. Edinb. 5: 270. 1912. TYPE: China. Dali, Yunnan, Delavay 1209 (holotype, P).

A. *duclouxii* Lévl. in Rep. Sp. Nov. 7: 99. 1909; Airy-Shaw in Kew Bull. 1932: 243. 1932; Hand.-Mazz. Symb. Sin. 7: 289. 1931 et in Acta Hort. Gotob. 13: 89. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 189, pl. 266, f. 14. 1950; W.

T. Wang in Fl. Reip. Pop. Sin. 27: 197. 1979, syn. nov. TYPE: China. Binchuan, Yunnan, Delavay 576 (holotype, E).

A. bullatifolium Lévl. Cat. Pl. Yunnan. 218. 1917; Ic. Corm. Sin. 1: 696, f. 1392. 1972. TYPE: China. Qiaojia, Yunnan, China, E. E. Maire s.n. (holotype, E)

A. coriophyllum Hand.-Mazz. in Sitzgsanz. Ak. Wiss. Wien. Math.-Nat. Kl. 67: 220. 1925 et Symb. Sin. 7: 292, t. 6, f. 4~5. 1931 et in Acta Hort. Gotob. 13: 90. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 200. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 93. 1965 et in Fl. Reip. Pop. Sin. 27: 193. 1979, syn. nov. TYPE: China. Zhongdian, Yunnan, Handel-Mazzetti 12994 (isotype, E, K).

A. dielsianum Airy-Shaw in Kew Bull. 1932: 244. 1932.—— *A. bullatifolium* var. *dielsianum* (Airy-Shaw) Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 191. 1950. TYPE: China. Lijiang, Yunnan, G. Forrest 3089 (lectotype, E; isolectotype, PE).

A. nagarum var. *heterotrichum* Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 203. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 194, pl. 36, f. 1~3. 1979, syn. nov. TYPE: Myanmar. Chawchi, Farrer 1896 (holotype, E).

A. bullatifolium var. *leiocarpum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 93. 1965.—— *A. nagarum* var. *heterotrichum* f. *leiocarpum* (W. T. Wang) W. T. Wang in Fl. Reip. Pop. Sin. 27: 196. 1979, syn. nov. TYPE: China. Jingdong, Yunnan, M. G. Li 0783 (holotype, PE; isotype, KUN); same locality, B. Y. Qiu 53760 (paratype, PE; isoparatype, KUN); same locality, B. Y. Qiu 53773 (paratype, PE; isoparatype, KUN).

Distribution: Yunnan, China; Myanmar.

Yunnan: west, no precise locality, G. Forrest 28955 (PE), 30577 (PE), 30953 (PE); Dali, G. Forrest 4691, 11695 (PE), 27956 (PE), T. N. Liou 21052, 21053 (PE), 21347 (PE), 017525 (PE), 019270 (PE), H. C. Wang (王汉臣) 1463 (PE), 4562 (PE), Z. W. Lu 73246, Q. Lin (林芹) 7703, K. M. Feng 8024, F. G. Pan 84012, X. Gong (龚洵) 8935; Yangbi (漾濞), Z. H. Yang (杨增宏) 101839 (PE), D. M. Zhang 89273; Jianchuan, C. C. Lu (吕春朝) 62081, P. I. Mao (毛品一) 00250 (PE); Binchuan (宾川), Delavay 576 (E), R. C. Ching (秦仁昌) 24711; Yunlong, F. G. Pan 84-02; Lijiang, G. Forrest 3089 (E; PE); Jingdong, B. Y. Qiu (邱炳云) 53760 (PE; KUN), 53773 (PE; KUN), M. G. Li (李鸣岗) 0783 (PE; KUN); Menglian (孟连), Y. Y. Qian (钱义咏) 2697 (PE); Tengchong, J. Z. Zhao (赵嘉志) 18; Zhongdian, Handel-Mazzetti 12994 (K); Weixi, C. W. Wang 67655 (PE), Q. E. Yang 8927; Gongshan, C. W. Wang 6734 (PE), K. M. Feng 76345 (PE), 7634, 7901, P. I. Mao 00415; Bijiang (碧江), C. C. Lu 62152, S. K. Wu 8768, 8815, 8844, Q. E. Yang 8938; Xundian (寻甸), Anonymous 3155 (PE); Qiaojia, E. E. Maire s.n. (E), H. T. Tsai 52051; Dongchuan (东川), X. B. Lan (蓝顺彬) 209 (PE).

Myanmar: Chawchi Pass, Farrer 1896 (E).

与原变种的区别在于花序轴和花梗通常均被开展的黄色腺毛。在原变种，花序轴和

花梗通常均被贴伏毛。

在我国乌头属植物标本中，长期以来都未能鉴定区厚叶乌头 *A. coriophyllum* Hand.-Mazz.。Handel-Mazzetti称该种的叶分裂程度较小，花黄色。最近我有机会在英国丘园检查了这个种的同号模式，发现它在体态、花序轴和花梗的毛被以及花的构造上与小白撑没有区别。小白撑这一类植物在叶裂片分裂程度和花的颜色上都有较大的变化。从标本上来看，其花的颜色实际上为淡绿白色而非黄色。

本变种在花梗毛被上在不同居群之间有时甚至在同一居群内都有一定程度的变化。有些植物（如上引碧江的标本）毛被明显是开展的；有些植物（如上引贡山、维西、巧家一带的标本）毛较开展。上引采自腾冲的赵嘉志18号标本共有两份，一份毛被开展，一份则毛被明显卷曲贴伏，给定名带来困难。

本变种在心皮毛被上也有一定变化。上引景东的标本心皮都无毛，常被定为一个变种或变型。考虑到上述原变种在心皮毛被上的变化，我们认为不宜再据此做这样的细分。

上引采自大理苍山一带的标本的花瓣有长1.5 mm左右的距，但距直不后弯。这样的植物过去常被定为种、变种或者变型。我们从采自贡山的标本看到，距从直立到弯曲之间有过渡。上引毛品一00415号标本距稍弯，冯国楣7901号标本的距后弯的程度较大，冯国楣7634号标本的距几乎是直立的，与产自大理苍山的标本没有区别。距的直立、弯曲与否可能与花的大小特别是上萼片的高矮有关系。在过去的中文命名中，象上述的距直的乌头常被冠以“无距”，实际上不太适宜，容易引起误解。因为这种植物实际上有距，只是不向后弯罢了，情形与无距乌头 *A. brevicalcaratum* var. *parviflorm* Chen et Liu不同；在无距乌头，花瓣确实无距。

This variety is distinguished from the typical one by usually having the indumentum of dense spreading yellowish glandular hairs on both the inflorescence axis and the pedicel. In the typical variety, both the inflorescence axis and the pedicel are usually covered with an indumentum of adpressed and curled hairs.

The species *A. coriophyllum* Hand-Mazz. has caught my attention for a long time, but from the collections of Chinese *Aconitum* deposited in the major herbaria of China, I could not determine its identity with certainty. According to Handel-Mazzetti's description, this species is characterized by the lower degree of leaf division and the yellow color of the flowers. In 1997, I checked the isotype of this species at Kew, and found that the plant has no essential difference from the variety under question in the general facies and the indumentum of the inflorescence axis and the pedicels. Its flowers are not yellow but blue-whitish. In *A. nagarum*, the degree of the leaf division is highly variable, so is the coloration of the flowers.

Although the indumentum of the pedicels in this variety is constant in most cases, sometimes it also shows variation between and within the populations. The collections from Bijiang have an indumentum of obviously spreading hairs, those from Gongshan, Weixi and Qiaojia have an indumentum of slightly spreading hairs; one collection from Tongchuan (J. Z. Zhao 18) includes two plants, in one of which the pedicels are covered with spreading hairs while in the other the pedicels are covered with adpreesed curled hairs, making the

identification quite difficult.

Like the typical variety, this variety also shows some variation in the hairiness of the carpels. All the collections from Jindong quoted above have glabrous carpels and are thus often named as var. *leiocarpum* or f. *leiocarpum*.

The collections from Mt. Cangshan, Dali, have the petal with a 1.5 mm long erect spur. Such plants were once given the ranks of species, variety or at least form. From the collections from Gongshan, I found that the curvature degree of the spur of the petal showed some variation between populations. The gathering P. I. Mao 00415 has the spur slightly bent backwards, and the gathering K. M. Feng 7901 has the spur more obviously bent backwards, while the gathering K. M. Feng 7634 has nearly erect spur, which is very similar to that of the plants from Dali. The curvature degree of the spur in this variety seems to be effected by the size of flowers and the height of the upper sepals. In the Chinese literature, those plants with the erect and short spur are often named "wu ju wu tou", which literally means " spurless *Aconitum* ". Such names, I should say, are quite misleading, because actually the petal of the plants with such names has, as I pointed out above, an erect, albeit quite short, spur.

5. 滇西乌头

A. bulleyanum Diels in Not. Bot. Gard. Edinb. 5: 267. 1912, p. p., excl. Pl. Delav.; Hand.-Mazz. in Acta Hort. Gotob. 13: 123. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 199. 1950, p. p.; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 65. 1965 et in Fl. Reip. Pop. Sin. 27: 202, pl. 38, f. 4~5. 1979. TYPE: China. Dali, Yunnan, G. Forrest 4372 (holotype, E).

Distributin: NW and W Yunnan, growing under mixed forests at altitudes from 3200 ~3600 m.

Yunnan: Dali, G. Forrest 4372 (E), H. C. Wang 2686, 4503, 4861 (PE), Y. Tsiang (蒋英) 11498, H. T. Tsai 53838 (PE), W. C. Wu (吴韫珍), C. Y. Yang (杨承元) & C. Y. Wu 11456; Heqing, Q. E. Yang 8823, 8843; Baoshan, R. Y. He 62011 (PE).

滇西乌头与匙苞乌头 *A. spathulatum* W. T. Wang、碧江乌头 *A. tsaii* W. T. Wang、膝瓣乌头 *A. geniculatum* Fletcher et Lauener 以及产于西藏的波密乌头 *A. pomeense* W. T. Wang 等种类在花梗和花序轴均无毛以及花的形状与构造上都是极为相似的。它们彼此在地理或生态上有或多或小的隔离，在茎的生长习性及小苞片的形状等方面多少有些不同。在乌头属中，这两个性状在同一种内往往是有变化的。因此，上述这些种类可能只是同一个种的不同的地方宗 (Local race) 或至多是地理宗 (Geographical race) 而已，最好是给予它们以变种或亚种的等级。考虑到研究尚不充分，材料也还不够丰富，在本文中我暂时将它们作为种处理。需要指出的是，这些"种" 的标本如果不知道产地，有时在鉴定上是比较困难的。Diels 发表 *A. bulleyanum* 时认为过去常被定为 *A. palmatum* D. Don 的 Delavay 4242 号标本也属于他这个种。Fletcher et Lauener (1950) 又认为这号标本应该定为 *A. bisma* (Ham.) Rapaics. 。我检查了这号标本，这号标本采

自鹤庆马耳山，实际上就是匙苞乌头 *A. spathulatum* W. T. Wang。这说明，这些种确实十分相似，有时连发表者本人也会认识不清。在《中国植物志》中，这些近缘的种类被置于不同的系，说明这样的系的划分可能是不太自然的。

Fletcher & Lauener (1950) 认为滇西乌头在缅甸亦产，我只检查了他们引证的两号标本 (Kingdon Ward 3575, PE 和 G. Forrest 27447, PE)，发现这两号标本在体态上与滇西乌头相似，但小苞片较宽，可能又是一个地理宗。

根据我在鹤庆马耳山的观察，滇西乌头通常在叶腋处产生珠芽，但珠芽的有无有很大的居群内变化，即同一居群中有些个体产生珠芽，有些则不产。这表明珠芽的有无在乌头属中可能没有分类上的意义。

This species resembles very much *A. spathulatum* W. T. Wang, *A. tsaii* W. T. Wang, *A. geniculatum* Fletcher et Lauener and *A. pomeense* in the shape and structure of flowers, particularly in the glabrous inflorescence axis and pedicels. They are more or less isolated in geographical distribution or habitats, and also somewhat different in the habit of the stem or the shape of the bracteoles. But in the genus *Aconitum*, these two characters are variable even within the same species. Hence these species may only represent different local races or geographical races within a species, and thus be better subjugated to subspecific or varietal rank. Their specific status is retained here pending a more detailed study. It should be noted that if the specimens of these "species" are not accompanied with precise locality records, it will be rather difficult to identify them correctly. When Diels (1912) described *A. bulleyanum*, he mentioned that the Delavay gathering 4242, which was identified as *A. palmatum* by Finet & Gagnepain, might also belong to his species. However, Fletcher & Lauener (1950) regarded this gathering should be identified as *A. bisma* (Ham.) Rapaics, obviously following Handel-Mazzetti (1939) and Rapaics (1907). I examined this collection and found that it was collected from Mt. Maershan, Heqing, and has no any difference from *A. spathulatum* W. T. Wang. What I mentioned above shows that these species really bear very close resemblance to each other, so much so that even their authors themselves may become confused about their identity. In Flora Reipublicae Popularis Sinicae, vol. 27, these species are placed in different series, implying such series may not be natural.

According to Fletcher & Lauener (1950), *A. bulleyanum* occurs also in Myanmar. I examined two collections quoted by them, Kindon Ward 3575 and G. Forrest 27447, both in PE, and found that the two collections resemble *A. bulleyanum* in general facies, but differ by the broader bracteoles, and thus may represent another geographical race of *A. bulleyanum*.

In Mt. Maershan, Heqing, I found that *A. bulleyanum* often bears bulbils in the leaf axils, but this character shows much variation even within the same population; some individual plants have bulbils while others have not bulbils within the same population. This fact indicates that the presence or absence of bulbils may be of no taxonomic value in *Aconitum*.

6. 匙苞乌头

A. spathulatum W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 65, pl. 1, f. 3. 1965 et in Fl. Reip. Pop. Sin. 27: 205, pl. 39, f. 3~5. pl. 45, f. 1. 1979. TYPE:

China. Heqing, Yunnan, R. C. Ching 24252 (holotype, PE; isotype, KUN).

A. palmatum auct. non D. Don: Finet et Gagnep. in Bull. Soc. Bot. Fr. 51: 514. 1904.

A. bisma auct. non (Ham.) Rapaics: Rapaics in Növ. Közl. 6: 164. 1907, p. p., quoad Delavay 4242; Hand.-Mazz. in Acta Hort. Gotob. 13: 104. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 197. 1950.

Distributin: Endemic to Mt. Maershan, Heqing, NW Yunnan, growing in alpine shrubs or meadows at altitudes from 3700～3900 m.

Yunnan: Heqing, Delavay 4242 (P), R. C. Ching 24252 (PE; KUN), Z. W. Lu 1037, Q. E. Yang 8842.

本种与滇西乌头 *A. bulleyanum* Diels 极为相近,只是小苞片较宽、匙形,植株直立而与后者不同。但茎的习性可能受环境影响很大;我们把本种移栽昆明后,茎的上部变得披散,与滇西乌头的茎无异。

根据我在鹤庆马耳山的观察,本种与滇西乌头在生态环境上是有一定隔离的。在马耳山,滇西乌头通常生长于海拔 3200～3400 m 一带杂木林下,而匙苞乌头生长于 3700～3900 m 一带高山灌丛或草甸中,形成垂直替代关系。

As I have pointed out above, this species bears most close resemblance to *A. bulleyanum*, only differs by the broader, spathulate bracteoles and erect stems. It should be noted that the habit of the stem in *Aconitum* is easily affected by the habitats. In fact, the stem of this species became much more flexible after the plant was transplanted to Kunming, and had no essential difference from that of *A. buleyanum*.

In geographical distribution, this species is restricted to Mt. Maershan, Heqing. In this mountain, *A. spathulatum* is somewhat isolated from *A. bulleyanum* in habitat, where the former grows in the alpine shrubs or meadows at altitudes from 3700～3900 m whereas the latter in the mixed forests at altitudes from 3200～3400 m, forming an obvious altudinal vicarious relationship.

7. 碧江乌头

A. tsaii W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 79, pl. 4, f. 13. 1965 et in Fl. Reip. Pop. Sin. 27: 240, pl. 52, f. 4. 1979. TYPE: China. Bijiang (now Lushui), Yunnan, H. T. Tsai 58074 (holotype, PE; isotype, KUN); same locality, H. T. Tsai 58270 (paratype, PE; isoparatype, KUN).

A. tsaii var. *geniculatum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 79. 1965. TYPE: China. Bijiang, Yunnan, H. T. Tsai 58591 (holotype, PE; isotype, KUN).

A. tsaii f. *purpureum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 79. 1965 et in Fl. Reip. Pop. Sin. 27: 241. 1979, syn. nov. TYPE: China. Bijiang, Yunnan, H. T. Tsai 54146 (holotype, PE; isotype, KUN).

A. tsaii var. *puberulum* W. T. Wang in Fl. Reip. Pop. Sin. 27, Addenda. 1979, syn. nov. TYPE: China. Bijiang, Yunnan, S. K. Wu 8842 (holotype, KUN).

A. refracticarpum Chang ex W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 77,

pl. 3, f. 10. 1965 et in Fl. Reip. Pop. Sin. 27: 238, pl. 49, f. 1~2. 1979, syn. nov. TYPE: China. Bijiang, Yunnan, H. T. Tsai 58475 (holotype, PE; isotype, KUN).

Distribution: Endemic to Mt. Biloxueshan, Bijiang, NW Yunnan, growing under mixed forests or in shrubs at altidudes from 3200~4100 m.

Yunnan: Bijiang, H. T. Tsai 58074 (PE; KUN), 58270 (PE; KUN), 58591 (PE; KUN), 54146 (PE; KUN), S. K. Wu 8842, H. T. Tsai 58475 (PE; KUN), Q. E. Yang 8939, 8940, 8941.

本种与滇西乌头 *A. bulleyanum* Diels 在体态上极为相似，只是小苞片通常较宽，椭圆形或匙形而与后者不同。与匙苞乌头 *A. spathulatum* W. T. Wang 也很相似，只是本种上部通常披散，具缠绕习性而不同。

碧江乌头产于云南碧江碧罗雪山。我对该地进行了野外考察，发现碧江乌头在海拔 3200 m 一带的林下即开始出现，但这里的植物叶分裂程度较小，茎上部明显缠绕；在海拔 3500 m 以上的草坡等较为开放的生境，叶的分裂程度加大，植株较为直立。所谓的垂果乌头即属于前一类型，但其花的构造以及小苞片的形状与碧江乌头没有区别，因此宜予归并。

本种有时在叶腋处可产生珠芽，但珠芽的有无有很大的居群内变化。

In general facies this species is most similar to *A. bulleyanum*, only different in the broader, elliptic or spathulate bracteoles. It also resembles *A. spathulatum* but differs by having the stem usually strongly flexible in the upper part.

In geographical distribution, *A. tsaii* is restricted to Mt. Biloxueshan, Bijiang. In this mountain, I found that this species began to appear from the mixed forest at an altitude of 3200 m, where the plant was quite rare, with the leaves being only relatively shallowly divided and the stems obviously climbing. In the meadow above an altitude of 3500 m, the plant became basically erect, with the leaves being more finely divided. The so-called *A. refracticarpum* Chang ex W. T. Wang belongs to the former type, but its flower structure and the shape of the bracteoles show no differences from those of *A. tsaii*, and thus they are conspecific.

This species sometimes has bulbils in the axils of leaves, but the presence or absence of bulbils has much variation within the same population.

8. 膝瓣乌头

A. geniculatum Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 201. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 65. 1965 et in Fl. Reip. Pop. Sin. 27: 205, pl. 40, f. 4~5. 1979. TYPE: China. Huize, Yunnan, E. E. Maire 1036 (holotype, E).

A. geniculatum var. *unguiculatum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 73. 1965 et in Fl. Reip. Pop. Sin. 27: 207, pl. 40, f. 6~8. 1979, syn. nov. TYPE: China. Luquan, Yunnan, P. I. Mao 1055 (holotype, PE; isotype, KUN); same locality, P. I. Mao 926 (paratype, PE; isoparatype, KUN).

A. geniculatum var. *humilius* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 73. 1965 et in Fl. Reip. Pop. Sin. 27: 207. 1979, syn. nov. TYPE: China. Puge,

Sichuan, Sichuan Econ. Pl. Exped. 5476 (holotype, PE; isotype, KUN).

A. pukeense W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 66, pl. 1, f. 4. 1965 et in Fl. Reip. Pop. Sin. 27: 207, pl. 32, f. 9~11. 1979 et in Bull. Bot. Res. 3: 26. 1983, syn. nov. TYPE: China. Puge, Sichuan, Sichuan Med. Pl. Exped. 25004 (holotype, photo, PE).

Distribution: NE Yunnan and SW Sichuan.

Yunnan: Huize (会泽), NE Yunnan Division 326, Dongchuan Division (东川队) 63-185, Y. Q. Liu (刘玉青) s. n; Dongchuan, Z. W. Lu 1826, C. R. Yang (杨崇仁) s. n. (PE), Anonymous 528 (YUNU), X. B. Lan 212 (PE), 548 (PE); Luquan (禄劝), Y. B. Chang (张英伯) 675, P. I. Mao 1055 (PE; KUN), 926 (PE; KUN), W. M. Chu 02823 (YUNU), Q. E. Yang 9102 (PE); Qiaojia, K. X. Yang (杨康玺) 7834 (PE). **Sichuan**: Puge (普格), Sichuan Med. Pl. Exped. (四川药源调查队) 25004 (照片 photo, PE), Sichuan Econ. Pl. Exped. 5476 (PE; KUN); Yuexi, Anonymous 14095 (PE); Jinyang (金阳), Anonymous 14693 (PE); Butuo, P. Guo (郭平) 88-001 (PE).

本种与匙苞乌头 *A. spathulatum* W. T. Wang 相近,但小苞片线状披针形或叶状、椭圆形、倒卵形或长圆形而与后者不同。有时在同一植株上各种小苞片可同时存在,因此,所谓的普格乌头 *A. pukeense* W. T. Wang 是不能成立的,应予归并。

上引朱维明 02823 号标本有 2 份,采自禄劝乌蒙山海拔 3200~3400 m 一带亚高山冷杉杜鹃林下及林缘。采自林缘的一份为典型的直立草本,高约 60 cm;采自林下的一份长约 2 m,为较典型的藤本植物,加上这个植株的小苞片为线状披针形,实际上与滇西乌头已无本质区别。

朱维明教授采集的标本,极为精致。上述这份长达 2 m 的标本,朱教授将之断为 6 节,每节各以序号编之,置于 6 张台纸上,将台纸连在一起,即可窥植株全貌。朱维明教授这种严谨认真的精神,实为后学楷模。

This species is closely allied to *A. spathulatum* W. T. Wang, from which it is different only in the linear-lanceolate or foliar, elliptic, obovate or oblong bracteoles. Sometimes bracteoles of different shapes are simultaneously present in the same plant individual, thus *A. pukeense* W. T. Wang should be reduced to synonymy.

A Luquan gathering quoted above, W. M. Chu 02823, includes two plants, one of which was collected from the margin of the forest at altitudes from 3200~3400 m, and is about 60 cm tall and basically erect, while the other was collected under the forest of the same locality, and is up to about 2 m long and belongs to typical climbing plant, and in addition, its bracteoles are linear-lanceolate in shape, so morphologically this plant actually has no substantial difference from *A. bulleyanum*.

Professor W. M. Chu's collections are very elaborately prepared and are of very high scientific value. The collection mentioned above, which is as long as 2 m, was cut to six parts, and then labelled by an alphabetical order and mounted on six specimen sheets. Putting the six sheets together in an alphabetical order, one can immediately get a vivid picture of the whole plant. Professor W. M. Chu, with his extremely serious scientific attitude

and the utmost scientific passion, sets a good example for the younger generation of plant taxonomists in China, not to mention his broad erudition in botany, particularly in the taxonomy of pteridophytes.

9. 苍山乌头

A. contortum Finet et Gagnep. in Bull. Soc. Bot. Fr. 51: 506, pl. 8, B. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 120. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 200. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 65. 1965 et in Fl. Reip. Pop. Sin. 27: 227, pl. 40, f. 1～3. 1979; Q. E. Yang in Acta Bot. Yunnan. 12: 251, f. 1. 1990; W. T. Wang in Acta Phytotax. Sin. 31: 202. 1993, p. p., excl. syn. *A. delavayi* var. *leiocarpum* Finet et Gagnep. TYPE: China. Dali, Yunnan, Delavay 1040 (holotype, P).

Distribution: NW Yunnan.

Yunnan: Dali, Delavay 1040 (P), G. Forrest 27939 (PE), H. C. Wang 4551, 4531 (PE), M. Chen (陈谋) 0692, R. C. Ching 25065, T. N. Liou 22397 (PE), K. M. Feng 26, Q. E. Yang 8835, 8837; Yunlong, Z. Y. He (何志远) s.n. (PE), G. Y. Gao (高光跃) 02 (PE), 89 (PE), Q. E. Yang 8825.

本种在习性、叶的分裂程度等方面有较大变化。生长于较封闭的环境如林下的植物(如产于大理花甸坝和云龙县者)常具缠绕习性;生长于较开放环境如林缘或林间草甸者(如产于大理中和峰电视台者)常为直立草本。上引本种的模式标本即为一直立草本,而云龙的标本均为典型的藤本植物。叶中裂片的开裂程度也有从较浅裂到细裂的一系列变化。

在叶形上,本种与紫乌头 *A. delavayi* Franch. 几乎没有区别,所以具有缠绕习性的一些植株有时被定为后者,以至于引起植物化学和药学研究上的混乱(杨亲二,1990),但它的花序轴、花梗、心皮均无毛,小苞片较宽而与后者易于区别。本种与滇西乌头 *A. bulleyanum* Diels 也相似,主要区别在于前者叶深裂而后者叶全裂。

经考证,本种块根具有解草乌毒功效,就是《植物名实图考》中记载的堵喇的原植物(杨亲二,1990)。

This species shows great variation in the habit of the stem and the degree of the leaf division. The plants growing in relatively close habitats, under forests for example, are obviously climbing; the collections from Yunlong and Huadianba of Dali (Q. E. Yang 8835, 8837) quoted above represent this type of plants. Those growing in relatively open habitats, such as in the margin of forests or the meadow in forests, are usually erect; the collection from Zhonghefen of Dali represents this type of plants. The holotype of this species also belongs to typical erect herb. In Yunlong, all the plants are found to be climbing. The division degree of the middle and lateral lobes of leaves of this species exhibits much variation from shallow to deep laceration.

In the shape of leaves, this species is very similar to *A. delavayi*, so the plants of the former with the climbing stem were often misidentified as the latter, which has resulted in much confusion not only in taxonomy of the two species but also in the phytochemical and

pharmaceutical research concerned (Yang, 1990). In fact, *A. contortum* is readily distinguishable from *A. delavayi* by having the inflorescence axis, pedicels and carpels being all glabrous, and the usually higher upper sepals as well as the broader bracteoles. *A. contortum* bears also some resemblance to *A. bulleyanum* in both having the glabrous inflorescence axis, the glabrous pedicels and carpels, but differs in the division degree of leaves. In *A. bulleyanum*, the leaves are deeply divided but never to the base whereas in *A. contortum* the leaves are usually divided to the base.

In Yunnan, the root tubers of this species are used by the ethnic people as an antidote to poisoning caused by other species of *Aconitum*. Thus this plant may be the so-called "Dula", a Chinese herbal medicine recorded in the famous work "Illustrated Investigations of the Identity of Chinese Plants" written by Wu Qi-jun in the Qin Dynasty (Yang, 1990).

10. 长喙乌头

A. georgei Comber in Not. Bot. Gard. Edinb. 18: 223. 1934; Hand.-Mazz. in Acta Hort. Gotob. 13: 122. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 202. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 65. 1965 et in Fl. Reip. Pop. Sin. 27: 207. 1979. TYPE: China. Zhongdian (?), Yunnan, G. Forrest 15195 (holotype, E).

A. longtouense T. L. Ming in Acta Bot. Yunnan. 7: 303, f. 2. 1985, syn. nov. TYPE: Lijiang, Yunnan, China, S. B. Wu 83001A (holotype, KUN).

Distribution: NW Yunnan.

Yunnan: Leilongshan (雷龙山), Zhongdian (?), G. Forrest 15195 (E), 15235 (E); Lijiang, S. B. Wu (吴少波) 83001B, 83001A, Q. E. Yang 8934.

上引的模式标本产地记载不详,但本种发表时引证的另外一份标本 (G. Forrest 15235) 据记录采自中甸东部山地。龙头乌头 *A. longtouense* T. L. Ming 采自丽江黑白水龙头山,大致位于中甸东南部。以前在我国各主要标本馆中均未发现有长喙乌头标本。承蒙英国爱丁堡皇家植物园标本馆 (E) 借予这个种的模式标本,发现龙头乌头就是长喙乌头。

本种与直缘乌头 *A. transectum* Diels 在花梗毛被 (均被卷曲贴伏柔毛)、花的形状与构造方面极为相似。主要区别在于前者叶深裂,中深裂片近羽状浅裂,小裂片顶端微钝,而后者叶多为全裂 (同一个居群中个别植株叶深裂),小裂片顶端锐尖。

The holotype quoted above bears no record of precise locality, but the paratype, G. Forrest 15235, was recorded to occur in the eastern mountains of Zhongdian. The so-called *A. longtouense* was collected from Mt. Longtoushan, Hebaishui, Lijiang, which is near to the southeastern part of Zhongdian. In the long past since the publication of *A. georgei*, its identity could not be determined satisfactorily in the several major Chinese herbaria. Examination of the type specimen has shown conclusively that *A. longtouense* and *A. georgei* are conspecific.

A. georgei bears close resemblance to *A. transectum* Diels in the indumentum of adpressed and curled hairs of the pedicels, and in the shape and structure of the flowers. They are different mainly in that the former has leaves deeply divided but never to the base, with

the middle lobes being almost pinnately subdivided and the ultimate lobules slightly obtuse at the apex whereas the latter usually has trisect (very rarely only deeply divided) leaves with the ultimate lobules acute at the apex.

11. 显柱乌头

A. stylosum Stapf in Kew Bull. 1910: 20. 1910; Hand.-Mazz. Symb. Sin. 7: 293. 1931 et in Acta Hort. Gotob. 13: 109. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 184. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 65. 1965; Ic. Corm. Sin. 1: 689, f. 1378. 1972; W. T. Wang in Fl. Reip. Pop. Sin. 27: 213, pl. 39, f. 1~2. pl. 45, f. 4. 1979. TYPE: China. Deqen, Yunnan, Th. Monberg s. n. (holotype, K)

A. euryanthum Hand.-Mazz. in Sitzgsanz. Ak. Wiss. Wien. Math.-Nat. K1. 62: 219. 1925. TYPE: China. Deqen, Yunnan, Handel.-Mazzetti. 9978 (holotype, n. v.).

A. stylosum f. *albidum* Chen et Liu in Bull. Fan. Mem. Inst. Biol., Bot. Ser. 11: 45. 1941. TYPE: China. Mekong-Salwin divide, Yunnan, T. T. Yu 22634 (holotype, PE; isotype, KUN).

A. stylosum var. *geniculatum* Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 184. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 214. 1979, syn. nov. TYPE: China. Chayü, Xizang, J. F. Rock 23087 (holotype, E; isotype, KUN); Mekong-Salwin divide, Yunnan, J. F. Rock 23093 (paratype, E; isoparatype, KUN).

Distribution: NW Yunnan and SE Xizang.

Yunnan: Gongshan, Th. Monberg s. n. (K), K. M. Feng 6560, 6572, 6772; Mekong-Salwin divide (澜沧江怒江分水岭), T. T. Yu 22634 (PE; KUN), 22534, 22297, 22846, 23182, 22389, J. F. Rock 23093 (E; KUN). **Xizang**: Chayü, J. F. Rock 23087 (E; KUN).

本种在小苞片的形状上有较大的变化，有叶状者，三裂者，不分裂而为长圆形、条形、线形或狭线形者。在同一植株上或同一居群的不同植株间都可以看到这种变化。在乌头属中，小苞片的形状在分类中的价值有时是难于把握的。

This species shows great variation in the shape of bracteoles. They can be foliar, trilobate, oblong, linear or anguste-linear in shape. Sometimes different types of bracteoles can be found present in the same plant individual or in different plant individuals of the same population. Although the shape of bracteoles is of some taxonomic value in the classification of some species of *Aconitum*, such as *A. bulleyanum* and its close allies, this character seems to have completely collapsed in the case of *A. stylosum*.

12. 独龙乌头

A. taronense (Hand.-Mazz.) Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 197. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 65. 1965 et in Fl. Reip. Pop. Sin. 27: 215, pl. 38, f. 1~3. pl. 45, f. 5. 1979. —— *A. bisma* (Ham.) Rapaics var. *taronense* Hand.-Mazz. Symb. Sin. 7: 284. 1931 et in Acta Hort. Gotob. 13: 105. 1939. TYPE: China. Gongshan, Yunnan, Handel-Mazzetti 9445 (isotype, E).

A. kungshanense W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 68. 1965 et in

Fl. Reip. Pop. Sin. 27: 215, pl. 45, f. 9. 1979, syn. nov. TYPE: China. Gongshan, Yunnan, P. I. Mao 00416 (holotype, PE).

Distribution: Endemic to Gongshan, NW Yunnan.

Yunnan: Gongshan, Handel-Mazzetti 9445 (E), T. T. Yu 20361 (PE), 20818 (PE), K. M. Feng 2595, 8277 (PE), P. I. Mao 00416 (PE; KUN), X. F. Deng (邓向福) 791387, 791474, Qinghai-Xizang Exped. 8718 (PE).

本种与显柱乌头 *A. stylosum* Stapf 极为相近,但上萼片低盔形,花较小而不同。

In general facies, this species bears most close resemblance to *A. stylosum*, from which it differs by the shorter-galeate upper sepals and the smaller flowers.

13. 滇北乌头

A. iochanicum Ulbr. in Bot. Jahrb. 47: 616, f. 2. 1913; Hand.-Mazz. in Acta Hort. Gotob. 13: 110. 1939, p. p.; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 94. 1965 et in Fl. Reip. Pop. Sin. 27: 190, pl. 35, f. 3~5. 1979, p. p., quoad Pl. NE Yunnan. TYPE: China. Qiaojia, Yunnan, E. E. Maire 2670 (holotype, n.v.).

Distribution: NE Yunnan.

Yunnan: Qiaojia, S. Z. Yang s. n. (杨声智); Dongchuan, C. R. Yang 7524, Anonymous 5299 (YUNU); Huize, Dongchuan Division 63-164; Luquan, Y. B. Chang 0658, W. M. Chu 02781 (YUNU), X. B. Lan 523 (PE).

Handel-Mazzetti (1931) 曾指出本种可能是属于茨开乌头 *A. souliei* Finet et Gagnep. 变异范围中的一个植株最矮小的类型。但他 (1939) 认为本种仅分布于滇东北,而茨开乌头产于滇西北,地理上有隔离,于是又将两者分开。

两者在形态上的主要区别在于植株高矮和叶的分裂程度上。但在植株高矮上,正如 Handel-Mazzetti (1931) 指出的,其间有很多过渡类型。上引朱维明 02781 号标本,采自禄劝乌蒙山,共有 3 个植株,高达 35~45 cm,实际上与茨开乌头已没有什么区别。采自德钦的俞德浚 23178 号标本 (KUN) 有两个植株,一个植株高约 10 cm,仅有两朵花,似可定为滇北乌头,但另一个植株高达 25 cm,有五朵花,似以定为茨开乌头为宜。在德钦燕门,我们发现了一个茨开乌头居群,植株很稀少,与长得十分茂盛的德钦乌头 *A. ouvrardianum* Hand.-Mazz. 混生在一起。这些植株在分枝与否及高矮上变化很大,15~45 cm 高的植株均有,有些不分枝,有些 3~4 分枝。(凭证标本见杨亲二 8924,KUN)。其中的矮小植株与采自滇东北的滇北乌头在高矮上是没有明显区别的。而且,不论这些植株大小如何,其块根都很小,极似于植株通常较小的滇北乌头的块根。这些都表明两者之间有密切的关系。

在叶的分裂程度上,两者的区别似乎更明显和稳定。茨开乌头叶的分裂程度较低,叶裂至距基部约 0.7 cm,裂片浅裂,而滇北乌头叶的分裂程度较大,叶裂至距基部约 0.2 cm,深裂片细裂。据此,我认为以前那些在标本室中被鉴定为滇北乌头的产于滇西北和藏东南的植株较矮小的植物实际上应定为茨开乌头。这样,在分布上,滇北乌头就仅产于云南东北部,而茨开乌头产于云南西北部和西藏东南部。

Handel-Mazzetti (1931) pointed out that this species might only belong to the dwarfest

type within the variation range of *A. souliei*, but he (1939) considered that the former is restricted to northeastern Yunnan in distribution whereas the latter to northwestern Yunnan, and they are thus geographically isolated, and their specific status should be retained.

In my opinion, they are mainly different in the plant size and the degree of leaf division. The plant size, however, as Handel-Mazzetti pointed out (1931), might include many intermediate types. A collection from Luquan, northeastern Yunnan quoted above, W. M. Chu 02781, which consists of three plant individuals as high as 35～45 cm, has no substantial difference from *A. souliei* in size. A collection from Deqen, nothwestern Yunnan quoted under the following species, *A. souliei*, T. T. Yu 23178, includes two plant individuals, one of which is 10 cm high and bears only two flowers, and seems to be better identified as *A. iochanicum* Ulbr., whereas the other is as high as 25 cm and bears 5 flowers and seems to be better identified as *A. souliei* Finet et Gagnep. if only their difference in plant size is considered. In the Mekong-Salwin divide of Yanmeng, Deqen, I found a population of *A. souliei* in a slopy meadow at an altitude of about 4100 m. The plants are very sparse and mixed with *A. ouvrardianum* Hand.-Mazz., which on the contray are very abundant. The plants of *A. souliei* show great changes in their size and the degree of branching. The plants are 15～45 cm high, and some are simple while others have 3～4 branches (Q. E. Yang 8924, KUN). The dwarfest plants have actually no difference in size from the plants of *A. iochanicum* from northeastern Yunnan. It merits mentioning that the root tubers are usually very small, no matter how the size of the aerial part of the plants changes, which is very simiar to the situation in *A. iochanicum*, further indicating their close relationship.

The difference in the degree of leaf division between the two species seems to be more constant and reliable. In *A. souliei*, the leaves are divided to 0.7 cm from the base, with the lobes only shallowly subdivided, whereas in *A. iochanicum*, the leaves are deeply divided to 0.2 cm from the base, with the segments finely divided. This character is highly correlated with the geographical distribution. Hence in my classification, those dwarf plants from northwestern Yunnan, which were often named as *A. iochanicum* in the past, are treated as *A. souliei*, while those higher plants from northeastern Yunnan, which were often named as *A. souliei*, are treated as *A. iochanicum*. On account of this treatment, both species are indeed isolated in geographical distribution, as emphasized by Handel-Mazzetti (1931).

14. 茨开乌头

A. souliei Finet et Gagnep. in Bull. Soc. Bot. Fr. 51: 515, pl. 9, B. 1904; Hand.-Mazz. Symb. Sin. 7: 293. 1931 et in Acta Hort. Gotob. 13: 110. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 204. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 65. 1965 et in Fl. Reip. Pop. Sin. 27: 222, pl. 42, f. 8～10. 1979. TYPE: China. Deqen, Yunnan, China, J. A. Soulie 1119 (holotype, P).

A. kunshanense auct. non W. T. Wang: W. T. Wang in Fl. Reip. Pop. Sin. 27: 215. 1979, p. p., quoad pl. 44, f. 10～11.

Distribution: NW Yunnan and SE Xizang.

Yunnan: Deqen, J. A. Soulie 1119 (holotype, P), T. T. Yu 23178, K. M. Feng 6552, 6743, T. T. Yu 79301, Q. E. Yang 8924; Bijiang, S. K. Wu 8762; Gongshan, J. S. Yang 83-219; **Xizang**: Chayü, Qinghai-Xizang Exped. 10109.

关于本种与滇北乌头的关系,详见对滇北乌头的讨论。本种与滇北乌头均具黄色的花,在云南乌头属乌头亚属 *Aconitum* L. subgen. *Aconitum* 植物中是较为特殊的。

See the discussion under *A. souliei* for the detail about the relationship between this species and *A. iochanicum*. Strictly speaking, in *Aconitum* subgen. *Aconitum* from Yunnan, only these two species are found to have yellow flowers.

15. 垂果乌头

A. pendulicarpum Chang ex W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 69. 1965 et in Fl. Reip. Pop. Sin. 27: 225, pl. 46, f. 9~10. 1979. TYPE: China. Chayü, Xizang, C. W. Wang 66223 (holotype, PE; isotype, KUN).

A. pendulicarpum var. *circinatum* W. T. Wang in Acta Bot. Yunnan. 5: 155. 1983, syn. nov. TYPE: China. Deqen, Yunnan, K. Y. Lang, B. S. Li & L. Q. Li 3751 (holotype, PE).

A. alboflavidum W. T. Wang in Acta Bot. Yunnan. 5: 153, f. 1: 1~3. 1983, syn. nov. TYPE: China. Deqen, Yunnan, K. Y. Lang, B. S. Li & L. Q. Li 3796 (holotype, PE).

Distribution: NW Yunnan and SE Xizang.

Yunnan: Deqen, K. Y. Lang, B. S. Li and L. Q. Li 3751 (PE), 3786 (PE), Q. E. Yang 8840, 8841. **Xizang**: Chayü, C. W. Wang 66223 (PE; KUN).

淡黄乌头 *A. alboflavidum* W. T. Wang 发表时的拉丁描述、中文描述以及插图互相不符。拉丁描述称该种的花序轴和花梗无毛,中文描述称其花序轴及花梗被短曲毛,插图中的花序轴及花梗均被毛,但看不出毛被的类型。从模式来看,其花序轴和花梗均被短曲毛。该种与垂果乌头实无区别,故应归并。

There is considerable discrepancy between the original Latin description, the Chinese description and the accompanying figures of *A. alboflavidum* W. T. Wang as to the type of the indumentum of the inflorescence axis and the pedicel. The Latin description stated that both the inflorescence axis and the pedicel are glabrous, the Chinese description stated that both the inflorescence axis and the pedicel are covered with an indumentum of short and adpressed curly hairs, while the figures showed that both the inflorescence axis and the pedicel are hairy, though the type of the hairs is not detectable. Examination of the type specimen has shown that both the inflorescence axis and the pedicel are covered with an indumentum of short and adpressed curly hairs, just as the Chinese description stated. In fact, *A. alboflavidum* has no substantial difference from *A. pendulicarpum* in any characters, and thus the former should be reduced to synonymy of the latter.

16. 哈巴乌头

A. habaense W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 80. 1965 et in Fl. Reip. Pop. Sin. 27: 241, pl. 49, f. 3~5. pl. 51, f. 6. 1979. TYPE: China. Zhongdi-

an, Yunnan, Zhongdian Division1346 (holotype, PE; isotype, KUN); same locality, K. M. Feng 2084 (paratype, PE; isoparatype, KUN).

A. chuianum W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 80. 1965 et in Fl. Reip. Pop. Sin. 27: 242. 1979, syn. nov. TYPE: China. Zhongdian, Yunnan, Zhongdian Division 1335 (holotype, PE; isotype, KUN).

Distribution: Endemic to Zhongdian, NW Yunnan.

Yunnan: Zhongdian, Zhongdian Division 1335 (PE; KUN), 1346 (PE; KUN), K. M. Feng 2084 (PE; KUN).

哈巴乌头 *A. habaense* W. T. Wang 和拟哈巴乌头 *A. chuianum* W. T. Wang 常被认为与玉龙乌头 *A. stapfianum* Hand.-Mazz. 相近而被置于蔓乌头系 ser. *Volubilia* Steinb.（王文采，1979，1965）。我仔细检查了两个种的模式标本，发现这两个种没有本质区别，而且也都不是藤本类型，与玉龙乌头无明显亲缘关系。从其花的构造及体态来看，似与冯氏乌头 *A. fengii* W. T. Wang 特别是其变种曲毛冯氏乌头 *A. fengii* var. *crispulum* Q. E. Yang 关系较近。

Both *A. habaense* W. T. Wang and *A. chuianum* W. T. Wang were regarded to be closely related to *A. stapfianum* Hand.-Mazz., and were then put together in Ser. Volubilia Steinb. (W. T. Wang 1979, 1965). From the type specimens, however, I cannot find any important difference between them. Moreover, both of them are basically erect rather than climbing plants. They are by no means closely related to *A. stapfianum*. From the general facies, the structure of the flowers and the geographical distribution, *A. habaense* may have more or less affinity with *A. fengii*, particularly with its variety, var. *crispulum* Q. E. Yang, though further studies are needed to elucdiate their relationship.

17. 冯氏乌头

A. fengii W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 71. 1965. —— *A. rockii* var. *fengii* (W. T. Wang) W. T. Wang in Fl. Reip. Pop. Sin. 27: 226. 1979. TYPE: China. Zhongdian, Yunnan, K. M. Feng 23267 (holotype, KUN).

A. stramineiflorum Chang ex W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 70. 1965 et in Fl. Reip. Pop. Sin. 27: 70. 1979, syn. nov. TYPE: China. Weixi, Yunnan, C. W. Wang 68601 (holotype, KUN).

A. dolichorhynchum W. T. Wang in Fl. Reip. Pop. Sin. 27, Addenda. 1979, syn. nov. TYPE. China. Deqen, Yunnan, J. S. Yang s. n. (isotype, PE)

A. laevicaule W. T. Wang in Acta Bot. Yunnan. 5: 155, f. 1: 4~6. 1983, syn. nov. TYPE: China. Zhongdian, Yunnan, K. Y. Lang, B. S. Li & L. Q. Li 2833 (holotype, PE).

17a. 冯氏乌头 原变种

var. **fengii**

Distribution: NW Yunnan.

Yunnan: Zhongdian, K. M. Feng 23267 (KUN), T. T. Yu 13988, Zhongdian Division 63-3382, F. G. Pan 8513, Y. F. Han (韩裕丰), K. M. Deng (邓坤民) & Y. R. Chen (陈永瑞) 81-1624 (PE), 81-1508 (PE), K. Y. Lang, B. S. Li & L. Q. Li 2833

(PE), Q. E. Yang 8908, 8913, 8914, 8915; Deqen, J. S. Yang s.n. (PE), Z. Nan (南主) 84-01; Weixi, C. W. Wang 68601 (PE).

王文采教授 (1965) 发表本种时,仅有 1 份标本 (冯国楣 23267,KUN)。后来王教授 (1979) 将本种降级为拟康定乌头 *A. rockii* Fletcher et Lauener 的一个变种,做出 *A. rockii* var. *fengii* (W. T. Wang) W. T. Wang 组合。

随着标本的增多,我们发现冯氏乌头应是一个独立的种。这个种的花序无毛,花梗被开展的毛,心皮无毛,小苞片通常条形,叶全裂或深裂至距基部 4～6 mm 而显然有别于拟康定乌头。

王文采教授 (1965) 发表草黄乌头 *A. stramineiflorum* Chang ex W. T. Wang 时,认为本种与茨开乌头 *A. souliei* Finet et Gagnep. 相近,但草黄乌头在小苞片的形状、花的形状和构造,以及花序轴无毛、花梗被开展的毛等方面均与冯氏乌头没有区别。其花的颜色据野外记录为黄色,但实际上与茨开乌头的花的金黄颜色完全不同。

我在中甸采集时,发现冯氏乌头这个种在中甸一带是较为常见的,以前采集的标本这么少,一方面可能是本种通常生长于林下,较难发现,另一方面也说明对滇西北一些地区的采集可能是不够深入的。

Professor W. T. Wang (1965) described this species based on a single collection from Zhongdian, K. M. Feng 23267. He (1979) subjugated it to varietal rank under *A. rockii* Fletcher et Lauener.

In the course of my study, much more material of *A. fengii* is available. I found that it is a well-delimited species. It is easily distinguishable from *A. rockii* by the glabrous inflorescence axis but relatively sparsely spreading-hairy pedicels, the glabrous carpels, the linear bracteoles and the leaves divided to the base or 4～6 mm from the base.

Professor W. T. Wang (1965) considered that his *A. stramineiflorum* bears close resemblance to *A. souliei* Finet et Gagnep. based on the field record that the former has yellow flowers. From the holotype, however, I found that by the shape of the bracteoles, the shape and structure of flowers, particularly the glabrous inflorescence axis but the sparsely spreading-hairy pedicels, *A. stramineiflorum* should be equated with *A. fengii*. By almost the same characters both *A. laevicaule* and *A. dolichorhynchum* should also be equated with *A. fengii*. It should be noted that the coloration of the flowers of *A. stramineiflorum*, though recorded as yellow, is quite different from that of *A. souliei* and is actually nearly whitish.

In Zhongdian, *A. fengii* is found quite common. The lacking of specimens in the past may be attributed, on the one hand, to that this species usually grows under forests at relatively high altitudes not easily accessible, on the other hand, to that the plant collecting in this area is far from complete.

17b. 曲毛冯氏乌头 新变种

var. **crispulum** Q. E. Yang, var. nov. TYPE: China. Zhongdian, Yunnan, Zhongdian Division 1390 (holotype, KUN; isotype, PE).

A. incisofidum W. T. Wang in Fl. Reip. Pop. Sin. 27: 281. 1979, p. p., quoad

Pl. Yunnan.

A var. typica rhachidi inflorescentiae et pedicellis crispulis differt.

Distribution: Endemic to Zhongdian, NW Yunnan.

Yunnan: Zhongdian, Zhongdian Division 1390 (KUN; PE), 63-3263, K. M. Feng 2099.

与原变种的区别在于花序轴和花梗被卷曲柔毛。

This variety can be readily distinguished from the typical one by having the indumentum of adpressed and curled hairs covering both the inflorescence axis and the pedicel.

18. 中甸乌头

A. piepunense Hand.-Mazz. Symb. Sin. 7: 290, T. 6, f. 6. 1931 et in Acta Hort. Gotob. 13: 115. 1939; Chen et Liu in Bull. Fan Mem. Inst. Biol., Bot. Ser. 11: 47. 1941, p. p.; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 204, 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 85. 1965 et in Fl. Reip. Pop. Sin. 27: 281, pl. 62, f. 8. pl. 63, f. 3～5. 1979. TYPE: China. Zhongdian, Yunnan, Handel-Mazzetti 4578 (isotype, E; photo, PE).

A. ramulosum W. T. Wang in Fl. Reip. Pop. Sin. 27. Addenda. 1978, syn. nov. TYPE: China. Zhongdian, Yunnan, J. S. Yang 8200 (holotype, PE).

18a. 中甸乌头 原变种

var. **piepunense**

Distribution: Endemic to Zhongdian, NW Yunnan.

Yunnan: Zhongdian, Handel-Mazzetti 4578 (E; photo, PE), T. T. Yu 12720, 13461, 13852, K. M. Feng 2467, S. W. Yu 62002, 62006, Zhongdian Division 841, J. S. Yang 8200 (PE), 88-295 (PE), 84-687 (PE), Q. E. Yang 8902.

18b. 毛果中甸乌头 变种

var. **pilosum** Comber in Not. Bot. Gard. Edinb. 18: 225. 1934; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 204. 1950; W. T. Wang in Fl. Reip. Pop. Sin. 27: 283. 1979. TYPE: China. Zhongdian, Yunnan, G. Forrest 28891 (holotype, E; isotype, PE).

A. rockii var. *ramosum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 72. 1965. TYPE: China. Zhongdian, Yunnan, Zhongdian Division 2081 (holotype, PE; isotype, KUN).

Distribution: Endemic to Zhongdian, NW Yunnan.

Yunnan: Zhongdian, G. Forrest 28891 (E; PE), Zhongdian Division 2081, K. M. Feng 23202, W. G. Huang (黄伟光), S. W. Yu 62008, Q. E. Yang 8910.

与中甸乌头的区别在于子房被毛。

王文采教授（1979）将 *A. rockii* var. *ramosum* W. T. Wang 合并于 *A. rockii* Fletcher et Lauener，但从其体态（分枝多而披散），上萼片盔较高，心皮被稀疏毛等特征来看，以归入毛果中甸乌头为宜。

This variety is different from the typical one by the more or less hairy carpels. In the typical variety, the carpels are glabrous.

Professor W. T. Wang (1979) combined *A. rockii* var. *racemosum* W. T. Wang into *A. rockii* Fletcher et Lauener, but the former is abundantly branched in the upper part and has slightly higher upper sepals and sparsely hairy carpels, and thus might better be reduced to synonym of *A. piepunense* var. *pilosum* Comber.

19. 瓜叶乌头

A. hemsleyanum Pritz. in Bot. Jahrb. 29: 329. 1900; Hand.-Mazz. Symb. Sin. 7: 295, pl. 5, f. 13～15. 1931 et in Acta Hort. Gotob. 13: 123. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 202. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 76. 1965; Ic. Corm. Sin. 1: 691, f. 1381. 1972 et in Fl. Reip. Pop. Sin. 27: 235, pl.41, f.3. pl.48,f.1～4.1979. —— *A. sczukinii* var. *hemsleyanum* (Pritz.) Rapaics in Növ. Közl. 6: 161. 1907. TYPE: China. Fangxian, Hubei, Henry 6646 (holotype, n.v.).

A. hemsleyanum var. *circinatum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 76. 1965 et in Fl. Reip. Pop. Sin. 27: 236, pl. 48, f. 5. 1979 et in Acta Bot. Yunnan. 6: 365, f. 1: 4～6. 1984, syn. nov. TYPE: China. Mt. Emei, Sichuan, G. H. Yang 56439 (holotype, PE; isotype, KUN).

A. hemsleyanum var. *elongatum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 77. 1965 et in Fl. Reip. Pop. Sin. 27: 236, pl. 48, f. 6. 1979 et in Acta Bot. Yunnan. 4: 131. 1982, syn. nov. TYPE: China. Mt. Erlangshan, Sichuan, H. L. Tsiang 37985 (holotype, PE; isotype, SZ).

A. chingtungense W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 77. 1965. —— *A. hemsleyanum* var. *chingtungense* (W. T. Wang) W. T. Wang in Fl. Reip. Pop. Sin. 27: 236. 1979, syn. nov. TYPE: China. Jingdong, Yunnan, B. Y. Qiu 53791 (holotype, PE; isotype, KUN).

A. hsiae W. T. Wang in l.c. 12, Addit. 1: 78, pl. 3, f. 2. 1965.—— *A. hemsleyanum* var. *hsiae* (W. T. Wang) W. T. Wang in l. c. 27: 238. 1979, syn. nov. TYPE: China. Cuona,, Xizang, G. C. Xia & T. K. Mi 844 (holotype, n.v.).

A. austroyunnanense W. T. Wang in l.c. 12, Addit. 1: 81, pl. 4, f. 15. 1965 et in Fl. Reip. Pop. Sin. 27: 243, pl. 50. pl. 51, f. 5. 1979, syn. nov. TYPE: China. Jingdong, Yunnan, B. Y. Qiu 52820 (holotype, PE; isotype, KUN).

A. hemsleyanum var. *unguiculatum* W. T. Wang in l.c. 27, Addenda, pl. 51, f. 4. 1979, syn. nov. TYPE: China. Weixi, Yunnan, P. I. Mao 403 (holotype, PE; isotype, KUN).

A. crassicaule W. T. Wang in l.c. 27, Addenda, pl. 48, f. 7～8. 1979, syn. nov. TYPE: China. Gongshan, Yunnan, K. M. Feng 7646 (holotype, PE; isotype, KUN).

A. weixiense W. T. Wang in Acta Bot. Yunnan. 4: 132. 1982. TYPE: China. Weixi, Yunnan, G. Forrest 28566 (holotype, E).

A. hemsleyanum var. *puberulum* W. T. Wang et L. Q. Li in Acta Bot. Yunnan. 8: 260. 1986, syn. nov. TYPE: China. Linzhi, Xizang, Xizang Inst. Biol. Pl. Resour. Exped. 4020 (holotype, PE).

A. hemsleyanum var. *lasianthum* W. T. Wang et L. Q. Li in Acta Phytotax. Sin. 25: 29. 1987, syn. nov. TYPE: China. Zhongdian, Yunnan, K. M. Feng 23498 (holotype, PE; isotype, KUN).

A. hemsleyanum var. *pilopetalum* W. T. Wang et L. Q. Li in l.c. 25: 29. 1987, syn. nov. TYPE: China. Muli, Sichuan, Liang Yong-fu *et al*. 84-55 (holotype, PE).

Distribution: Yunnan, Sichuan, Guizhou, Xizang, Hubei, Hunan, Jiangxi, Anhui, Zhejiang, Shaaxi, Henan.

Yunnan: West, no precise locality, G. Forrest 28905 (PE), 28948 (PE); Zhenxiong, D. D. Tao (陶德定) 7090; Daguan (大关), NE Yunnan Division 428; Qiaojia, S. Z. Yang s. n.; Dali, M. Chen 3135 (PE), Q. E. Yang 8942; Weishan (魏山), G. Y. Gao and P. Tan (谭沛) 06 (PE); Jianchuan, W. T. Wang 465; Zhongdian, K. M. Feng 23498, J. S. Yang 84-1169 (PE); Weixi, K. M. Feng 24079, P. I. Mao 00403; Deqen, Anonymous 24079 (PE), Q. E. Yang 8922; Gongshan, K. M. Feng 6957, 7646; Jingdong, Y. B. Chang 784, B. Y. Qiu 52820, 53100, 53791, S. G. Xu 5275, Z. H. Yang 101359; Yongde (永德), T. P. Zhu (朱太平) 0201; Xinping (新平), S. K. Wu 445. **Sichuan:** Leibo, T. T. Yu 4114 (PE); Meigu, Sichuan Econ. Pl. Exped. 1347 (PE), 1865 (PE); Yuexi, Anonymous 5377 (PE); Pingshan, Sichuan Econ. Pl. Exped. 972 (PE); Mabian, T. T. Yu 5845 (PE); Ebian (峨边), Z. T. Guan 6599 (PE), Z. X. Zhao (赵子孝) 656; Mt. Emei, T. H. Tu 588 (PE), M. Z. Zeng (曾勉之) 188 (PE), J. H. Xiong, S. S. Chang (张秀实) & H. L. Tsiang 31884 (PE), 32348 (PE), H. C. Zhou (周鹤昌) 8331 (PE), W. P. Fang 12942, G. H. Yang 56439 (KUN; PE), 56546, 57402, D. D. Tao 11430, Anonymous 706, C. Y. Wu *et al*. 0-101, K. H. Shing (邢公侠) & K. Y. Lang 140 (PE), Y. L. Chen 17 (PE), Z. R. Wang (王中仁) & Z. X. Zhang (张志宪) 164 (PE); Hanyuan, T. P. Wang 9649; Luding (泸定), H. L. Tsiang 35465 (PE); Kangding, C. S. Liu 1586; Tianquan, T. H. Tu 4615, H. L. Tsiang & J. H. Xiong 35347, 35355, 37385, 37963 (PE; SZ), 37985 (PE, SZ), K. C. Guan & W. T. Wang 1933 (PE), 3221 (PE), Sichuan Econ. Pl. Exped. 00626 (PE), Anonymous 786; Mt. Erlangshan (二郎山), C. Y. Wu *et al*. 6299; Pengxian (彭县), W. J. Zhang (张文锦) 92-8-18 (PE); Anxian (安县), P. Guo 87-013 (PE); Nanchuan, W. P. Fang 1026 (PE), G. F. Li 63867; Wuxi, G. H. Yang 59465 (PE), 65460 (PE). **Guizhou:** Panxian (盘县), Anshun Division (安顺队) 887; Nayong (纳雍), Bijie Division (毕节队) 689. **Xizang:** Linzhi (林芝), Xizang Inst. Biol. Pl. Resour. Exped. 4020 (PE); Cuona (错那), Supplementary Qinghai-Xizang Exped. (青藏补点) 751754. **Hubei:** Xuanen (宣恩), H. J. Li 4316 (PE); Lichuan (利川), L. Y. Dai (戴伦膺) & C. H. Qian (钱重海) 1458 (PE); Badong, Q. L. Chen *et al*. (陈权龙等) 1903 (PE), Hubei Bot. Exped. (鄂植考队) 25054 (PE); Enshi (恩施), G. X. Fu (傅国勋) & Z. S. Zhang (张志松) 1213; Xingshan, T. P. Wang 11901 (PE), Q. L. Chen *et al*. 2084 (PE); Shennongjia (神农架林区), Hubei Bot. Exped. 25120 (PE), 25551 (PE), Sino-Amer. W Hubei Bot.

Exped. 69, 154, 388, 1156, 1320, 1777. **Hunan**: Sangzhi (桑植), L. H. Liu (刘林翰) 9067 (PE). **Jiangxi**: Wuning (武宁), S. K. Lai (赖书绅) 3083 (PE). **Anhui**: Yuexi (岳西), Nanjing Sun Yatsen Botanic Garden (南京中山植物园) 7023 (PE); Qingliangfeng Peak at the border between Anhui and Zhejiang (皖浙边界清凉峰), X. Zhou (周许) & C. Pan (潘程) 564 (PE). **Zhejiang**: Mt. Tianmushan (天目山), Anonymous 31180 (PE), Fudan Univ. 10318 (PE), Zhejiang Pl. Resour. Exped. (浙江植物资源普查队) 29557 (PE). **Henan**: Xixia, Henan Exped. (河南队) 1691 (PE); Lingbao (灵宝), Fu Jing-qiu (傅竞秋) 206; Lushi, K. M. Liu 5139 (PE), 5346 (PE), J. Q. Fu 613, 2081; Songxian, Anonymous 34941 (PE), Henan Exped. 2539 (PE), Depart. Agr., Henan Prov. Govern. (河南农业厅) 1006 (PE), Pl. Resour. Survey Exped. (植物资源普查队) L0177 (PE). **Shaanxi**: Shanyang, T. P. Wang 16343; Ningshan (宁陕), Z. W. Chang (张振万) 1434 (PE); Huxian, P. C. Kuo 614 (PE), 858 (PE); Mt. Huashan (华山), T. P. Wang 19700, K. S. Hao 4021 (PE); Mt. Zhongnanshan (终南山), F. T. Wang *et al*. (汪发缵等) 504 (PE).

本种是我国乌头属植物中分布较广、极为多型的一个种。一些乌头属中通常较为稳定的重要分类性状,诸如花梗的毛被、上萼片的形状、花瓣的形状等在本种都有极大的变异,其它一些本来就多变的性状,例如雄蕊、花瓣、心皮等的毛被变化更是难于把握。近年来常见有本种的新变种发表,变种数目已多达近10个。如果还象以前一样根据不同的性状组合来划分本种,还可以分出一系列变种。

我检查了本种的模式产地湖北西部神农架一带的标本,发现这里的本种植物也很多变,而且是在重要性状上——花序轴和花梗的毛被等方面多变。有些标本的花梗、心皮明显是无毛的,有些则有疏密不同的贴伏柔毛。大部分标本的上萼片没有明显的爪,喙也很短,但有些标本的上萼片则有明显的爪和较长的喙。云南和四川的植物在花梗毛被上也表现出很大的居群间变化,上萼片形状也有很大的居群间和居群内变化。

在本种里,花瓣的距的长短常作为划分变种的依据,但这种长短的变化几乎都是连续的,与地理分布几乎没有多少相关性。采自同一居群的植物有时都可以划分成不同的变种。

至于上萼片形状(具爪与否)、花瓣毛被等更是表现出极无规律的变化。产于四川峨嵋山的标本通常花瓣都是无毛的,但上引吴征镒0-101号标本花瓣爪部明显地被有开展毛。云南的标本花瓣通常也没有毛,上引采自下关的杨亲二8942号标本花瓣的距有疏毛。

因为本种的各个性状几乎都有变化,种下变种的性状往往是交叉的。同一个植株可以鉴定为这个变种,似乎也可以定为另外几个变种,我们认为划分这些变种实际上是没有多少意义的。

“粗茎乌头 *A. crassicaule* W. T. Wang”被认为是上萼片盔形而有别于瓜叶乌头的一个种。我检查了这个“种”的模式(冯国楣7646,Type, PE; Isotype, KUN)和另外一号被鉴定为本种的标本(冯国楣6957,KUN),这两号标本都采自德钦、贡山一带的沧怒分水岭。我发现它们的上萼片实际上是高盔形的,因为折叠而看上去似乎为盔形的。这

两号标本的花的上萼片有一个明显的特点，就是具明显的爪和较长的喙（约达 5mm）。我在德钦燕门沧怒分水岭采到了本“种”，上萼片是高盔形的，但压制标本时盔下折而象盔形的。这些植物的上萼片的喙较长、具明显的爪，可能是瓜叶乌头的一个变型。考虑到瓜叶乌头是一个多型的种，我把“粗茎乌头”直接并入瓜叶乌头而不作为种下类群处理。我在野外考察中发现，瓜叶乌头在云南德钦、维西澜沧江流域一带海拔 3200～3500 m 的林下相当常见，其花序轴，花梗和心皮均无毛。*A. weixiense* W. T. Wang 属于这类植物。

“滇南草乌 *A. austroyunnanense* W. T. Wang”被认为是与黄草乌相近的一个种，主要只是前者叶深裂而后者叶全裂不同。我检查了“滇南草乌”的模式，发现这个种实际上是瓜叶乌头。所谓的“截基瓜叶乌头 *A. hemsleyanum* var. *chingtungense* W. T. Wang”的模式与“滇南草乌”的模式几乎采自同一具体地点，从模式标本上看，它们的形态很相似，但它们被划分为不同的类群，显然是不合理的。

瓜叶乌头因为分布较广，形态性状多变，是研究乌头属植物性状变异规律的一个极好的材料。从这个种的性状变异看来，对国产乌头属的种类可能应该做较多的归并。

A. hemsleyanum is one of the most widely distributed and highly variable species of *Aconitum* in China. Some of the most constant diagnostic characters for the classification of this genus, such as the type of the indumentum of the pedicels and the shape of the upper sepals, show great variation in this species, let alone those which are often easily variable, such as the hairiness of the stamens, of the petals and of the carpels. Nearly ten varieties have been described under this species. If such a treatment was followed, more new varieties, which were based on different combinations of some variable characters, could be described.

I examined a lot of specimens from west Hubei, the type locality of this species, and found the plants of the species in this area are also highly variable in some important characters such as the indumentum of the pedicels and of the carpels, and the shape of flowers. Some specimens have glabrous pedicels and carpels, but others have densely or sparsely hairy pedicels and carpels. The upper sepals in most of the collections are neither obviously clawed nor beaked, but in some are obviously clawed and long beaked. The plants from Yunnan and Sichuan also show great variation within population in the indumemtum of the pedicels as well as in the shape of the sepals.

In this species, the length of the spur of the petal was often used as a criterion for the establishment of new varieties. I found that this character is highly variable and the variation is continuous, and not correlated with geographical distribution. Sometimes the plants within the same population could be identified as different varieties.

The hairiness of the petals shows more irregular variation. The petals of the collections from Mt. Emei, Sichuan, are usually glabrous, but those of the collection C. Y. Wu 0-101 are covered with sparse spreading hairs on the claw. The gatherings from Yunnan usually have glabrous petals, but one gathering from Dali, Q. E. Yang 8942, have petals covered with sparse spreading hairs on the spur.

As nearly all the characters in this species are highly variable, and the characters, on

which the varieties are established, are overlapping in variation, it is rather difficult to identify different varieties with certainty. Obviously, the recognition of such varieties is taxonomically senseless.

I examined the type of *A. crassicaule* W. T. Wang, K. M. Feng 7646, from Gongshan, and another gathering, K. M. Feng 6957 from the same area, and found that the original description, which stated that the upper sepals are shortly galeate, is quite wrong. The upper sepals of the type specimen are strongly folded and thus look very short. Actually the upper sepals are found to be as high as those of *A. hemsleyanum* when the flowers are fully spread after being immersed in hot water for some time. These two gatherings have one common feature that their upper sepals are obviously clawed and long beaked, with the beaks up to 5 mm long. They may represent a variant form of *A. hemsleyanum*. Considering the high polymorphism of this species, I treat it directly as a synonym of *A. hemsleyanum* instead of as a form. In the Mt. Yunling and the Mekong-Salwin divide in Deqen and Weixi, such plants are quite common under the mixed forests at altitudes between 3200～3500 m. Furthermore, it is noteworthy that these plants all have glabrous inflorescence axis, glabrous pedicels and carpels. *A. weixiense* W. T. Wang obviously belongs to such plants.

A. austroyunnanense W. T. Wang is regarded to be closely related to *A. vilmorinianum* Kom., different mainly in that the former has deeply divided leaves while the latter has trisect leaves. Examination of the holotype of *A. austroyunnanense* shows that it is conspecific with *A. hemsleyanum*. The type specimen of *A. hemsleyanum* var. *chingtungense* was actually collected from the same locality as that of *A. austroyunnanense*. Both type specimens are very similar in general facies, which further indicates that it is unacceptable to treat them as different taxa.

As mentioned above, *A. hemsleyanum* is one of the most widely distributed and highly polymorphic species in the genus *Aconitum*, thus it can be used as an ideal material for the research of the pattern and process of morphological variation in this genus. From my perhaps still very superficial understanding of the morphological variation in this species, I anticipate that more species of the genus *Aconitum* may be reduced to synonyms.

20. 玉龙乌头

A. stapfianum Hand.-Mazz. Symb. Sin. 7: 294, t. 5, f. 11, 12. 1931 et in Acta Hort. Gotob. 13: 125. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 204. 1950, p. p., excl. Pl. Xizang.; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 76. 1965 et in Fl. Reip. Pop. Sin. 27: 248, pl. 51, f. 10. pl. 53, f. 3～5. 1979 et in Acta Phytotax. Sin. 31: 205. 1993. TYPE: China. Lijiang, Yunnan, Handel-Mazzetti 4108 (holotype, n. v.); same locality, G. Forrest 6500 (paratype, E); same locality, G. Forrest 6552 (paratype, E).

A. pseudostapfianum W. T. Wang in Acta Phytotax. Sin. 12: 156, pl. 45, f. 1. 1974 et in Fl. Reip. Pop. Sin. 27: 247, pl. 49, f. 9～11. 1979, syn. nov. TYPE: China. Lijiang, Yunnan, C. Y. Wu & D Y. Liu 21314 (isotype, KUN).

A. stapfianum auct. non Hand.-Mazz.: Lauener in Not. Bot. Gard. Edinb. 25:

29. 1963.

Distribution: NW Yunnan.

Yunnan: Dali, Q. E. Yang 8832, 8836; Lijiang, K. M. Feng 2971, 22716, 21227, C. Y. Wu & D. Y. Liu 21314 (KUN), W. T. Wang 87, S. W. Yu s.n., Collect. Team 701 (701 组) 73010, 73011, 73012, Q. E. Yang 8832, 8836, 8847, 8930.

本种与紫乌头 *A. delavayi* Franch. 相近,但花序轴、花梗、心皮等通常无毛,上萼片通常较低,盔形,可与后者区别。

本种在叶裂片开裂程度上,居群内的变化很大。所谓的拟玉龙乌头 *A. pseudostapfianum* W. T. Wang 仅以叶裂片分裂程度较小而区别于本种,实际上这个种是人为的。我们可以在玉龙乌头居群中找出比拟玉龙乌头的模式标本叶裂片分裂程度更小的植株,如上引冯国楣 21227 号标本。在苍山乌头 *A. contortum* Finet et Gagnep.、紫乌头 *A. delavayi* Franch.、保山乌头 *A. nagarum* Stapf 以及其它一些种,叶裂片分裂程度都有很大的居群内和居群间的变化。

在垂直分布上,本种与紫乌头可能形成替代关系。在大理苍山,前者分布于 3600～3800 m 之间,后者分布于 2700～3400 m 一带;在丽江玉龙山,前者分布于 3200～3400 m 一带,后者分布于 2800 m 一带。Fletcher 和 Lauener (1950), Lauener (1963) 认为西藏东南部亦产本种。从它们引证的 F. Kindon Ward 6189 号标本的照片 (PE) 来看,这号标本叶深裂而非全裂,极可能是藏南藤乌 *A. elwesii* Stapf。

This species is very similar to *A. delavayi* Franch., from which it differs in having the glabrous inflorescence axis, the glabrous pedicels and carpels, and the shorter galeate upper sepals.

This species shows some variation within population in the degree of the subdivision of the leaf lobes. *A. pseudostapfianum* Hand.-Mazz., a species described from Mt. Yulongshan, Lijiang, the type locality of *A. stapfianum* Hand.-Mazz., was claimed to be different from *A. stapfianum* in having leaves with the lobes being only shallowly subdivided. Actually I cannot find any essential difference between them even in this character, not to say other important characters.

A. stapfianum and *A. delavayi* seem to form an altitudinal vicarious relationship. In Mt. Cangshan, Dali, the former occurs at altitudes between 3600～3800 m, whereas the latter at altitudes between 2700～3400 m. In Mt. Yulong, Lijiang, the former occurs at altitudes between 3200～3400 m, while the latter at an altitude of about 2800 m. Fletcher & Lauener (1950), and Lauener (1963) pointed out that *A. stapfianum* also occurs in southeast Xizang (Tibet). From the photograph of a gathering cited by them, F. Kindon Ward 6189 (PE), it can be seen that the plant has leaves deeply divided rather than trisect and thus may better be identified as *A. elwesii* Stapf.

21. 紫乌头

A. delavayi Franch. in Bull. Soc. Bot. Fr. 33: 381. 1888; Finet et Gagnep. in Bull. Soc. Bot. Fr. 51: 507. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 125. 1939, p. p., excl. syn. *A. episcopale* Lévl. et Pl. Sichuan; Fletcher et Lauener in Not. Bot. Gard. Ed-

inb. 20: 194. 1950, p. p.; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 76. 1965; Ic. Corm. Sin. 1: 691, f. 1382. 1972; W. T. Wang in Fl. Reip. Pop. Sin. 27: 284, pl. 66, f. 7~9. 1979. TYPE: China. Eryuan, Yunnan, Delavay 1850 (holotype, P).

A. delavayi var. *leiocarpum* Finet et Gagnep. in Bull. Soc. Bot. Fr. 51: 507. 1904; Hand.-Mazz. in Acta Hort. Gotob. 13: 125. 1939. Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 194. 1950, p. p., excl. syn. *A. episcopale* Lévl. et E. E. Maire 907; Lauener et Green in Not. Bot. Gard. Edinb. 23: 575. 1961, p. p., excl. syn. *A. episcopale* Lévl. TYPE: China. Dali, Yunnan, Delavay 1041 (holotype, P).

A. tripartitum Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 195. 1950. TYPE: China. Dali, Yunnan, G. Forrest 6873 (holotype, E); same locality, G. Forrest 28100 (paratype, E; isoparatype, PE).

A. episcopale var. *villosulipes* W. T. Wang in Acta Phytotax. Sin. 31: 204. 1993, syn. nov. TYPE: China. Dali, Yunnan, H. C. Wang 4458 (holotype, PE).

A. volubile var. *villosum* auct. non Regel: Franch. in Bull. Soc. Bot. Fr. 33: 381. 1888.

A. volubile var. *tenuisectum* auct. non Regel: Franch. in l.c.

A. villosum var. *flexuosum* auct. non. Reich. : Finet et Gagnep. in Bull. Soc. Bot. Fr. 51: 506. 1904, p. p.

A. episcopale auct. non Lévl. : W. T. Wang in Fl. Reip. Pop. Sin. 27: 248, pl. 51, f. 8. pl. 52, f. 1. 1979, p. p. major.

Distribution: NE and NW Yunnan.

Yunnan: Dali, Delavay 10 (P), 1041 (P), 1848 (P), G. Forrest 28100 (PE), H. C. Wang 1350, 4458, T. N. Liou 21295, Q. Lin 7702, 7751, Sino-Amer. Yunnan Bot. Exped. (中美云南植物考察队) 1110, F. G. Pan 84-05, Q. E. Yang 8830, 8831, 9404 (PE); Eryuan (洱源), Delavay 1850 (Typus, P), W. T. Wang 503; Jianchuan, Y. Q. Mo (莫云强) 62012, C. C. Lu 62022; Binchuan, R. C. Ching 24717, T. N. Liou 21918, W. C. Wu, C. Y. Yang & C. Y. Wu 12072; Heqing, R. C. Ching 25557, 25574, W. T. Wang 316, 337, Collect. Team 701 73003, 73004, 73005, 73006, 73007, 73009, 73015, Z. W. Lin (林中文) 85-21, Q. E. Yang 8844; Lijiang, R. C. Ching 21656, X Gong s.n.; Yongsheng, Collect. Team 701 73015; Lanping, S. K. Wu 9055; Fengqing, C. Chen 94; Luquan, W. M. Chu 02096, 02490 (YUNU); Dongchuan, Y. C. Li (李运昌), S. B. Lan 283 (PE).

本种在分类上和名称的使用上一直存在着很多混乱。

Franchet (1888) 根据 Delavay 采自云南洱源的标本 (Delavay 1850) 发表了本种。虽然他在描述中称"茎纤细,弯曲" (Caulis gracilis flexuosus) ,但从模式标本上的 3 个植株来看,给人以这个种是直立草本的印象。

Finet & Gagnepain (1904) 根据 Delavay 采自云南大理苍山的标本 (Delavay 1041) 发表了一个变种 *A. delavayi* var. *leiocarpum* Finet et Gagnep. ,他们认为本变种子房无毛而与原变种有区别。这个变种是典型的草质藤本植物。

Handel-Mazzetti (1939) 基本上承认上述分类,但他把 Léveille (1914) 根据 E. E. Maire 采自滇东北可能是巧家一带的标本 (Maire 433, E) 发表的 *A. episcopale* Lévl. 并入 *A. delavayi* Franch. 。同时,他认为四川亦产本种。应当说,Handel-Mazzetti 的处理是造成 *A. delavayi* 的分类混乱的根源。

Fletcher & Lauener (1950) 基本同意 Handel-Mazzetti 的意见,但他们认为 *A. episcopale* Lévl. 心皮无毛,应该并入 *A. delavayi* var. *leiocarpum* Finet et Gagnep. 。在原变种和变种之下,他们均未引证四川标本。

王文采教授 (1979) 与上述作者的意见有较大分歧。他指出 *A. delavayi* Franch. 和 *A. episcopale* Lévl. 是有区别的两个种,但实际上他对这两个种的特征及其地理分布作了错误的阐释。他认为两者的花梗都被开展的毛,花的构造也相似,可能有亲缘关系,但前者茎直立,特产于云南鹤庆与洱源之间的马耳山,而后者茎缠绕,分布于滇西北和川西南一带。1993 年,王文采教授发现他以前对 *A. episcopale* 的认识是错误的 (他以前认为该种的花序轴和花梗被开展的毛,实际上是被卷曲毛,见下),并予以订正。但关于 *A. delavayi*,他仍然认为该种属直立草本。这样,他就把他以前认为是 *A. episcopale* 的花梗具开展毛的藤本类型的植物作为一个新变种发表,即 *A. episcopale* var. *villosulipes* W. T. Wang。同时,他认为 Delavay 1041 号标本与苍山乌头没有差别,因此,他又将 *A. delavayi* var. *leiocarpum* Finet et Gagnep. 并入苍山乌头之中。

确实,如果单从 *A. delavayi* Franch. 的模式来看,这个种确实给人以直立草本的印象。我检查了大量有关的标本并在云南大理、鹤庆一带做了详细的野外调查,发现这个种并不特产于鹤庆马耳山,而是一个分布较广的种,其模式标本可能仅是一个偶然的极端变异类型。采自鹤庆马耳山的秦仁昌 25574,25557 号标本似乎是直立草本,但上部有明显的缠绕倾向。采自同地的王文采 337 号标本,有一份确实象直立草本 (作为《中国植物志》绘图标本),但同号的另外两份标本则很象藤本。这号标本采自海拔 3700 m 一带草坡,而这个种的缠绕的植株在鹤庆马耳山通常生长于 2700 m 以下。我们在这号标本原产地做过几次调查,不但找不到直立的植株,即使缠绕的植株也找不到。因此上述标本和模式标本可能只是极端变异类型而已。如果要把这样的变异类型划分为种,可能只是一个“纸上的种”(Paper species)。实际上,在乌头属植物中,茎的形态受环境影响很大。在碧江乌头、膝瓣乌头,特别是苍山乌头中,均可以找出直立草本和藤本两种类型。我们认为 *A. delavayi* Franch. 虽然是一个独立存在的种,但并非王文采教授 (1979) 指出的那样这个种仅产于鹤庆马耳山,茎直立,相反,这个种是一个茎通常缠绕且分布较广的种。王文采教授在《中国植物志》中记载的 *A. episcopale* Lévl. 的大部分应该是本种植物,而不是 Léville 的 *A. episcopale* (见下面分析)。

紫乌头 *A. delavayi* Franch. 以其花序和花梗通常有开展的毛、上萼片高盔形等特征而易于与近缘种相区别,但这些性状特别是花梗毛被和心皮毛被有较大的变化。我们在大理苍山花甸坝观察到,*A. delavayi* 的大部分植株的花序轴、花梗和心皮都有开展的毛,但有些植株仅花序轴有开展的毛,花梗和心皮都无毛,而有些植株花序轴和花梗有开展的毛,心皮无毛。这些变异情况都反映在杨亲二 9404 号标本中。采自兰坪的武素功 9055 号标本有两个植株,一个植株的全部花梗都无毛,心皮也均无毛。采自鹤庆的 701

组73004号标本,花梗无毛,心皮有稀疏毛。来自上述产地的大部分标本都是花梗和心皮有毛的。因此可以看出,本种在花梗和心皮的毛被上有一些居群间和居群内的变化,心皮无毛的植物不宜再划分为变种,故 *A. delavayi* var. *leiocarpum* Finet et Gagnep. 应予以归并。王文采教授(1993)把 *A. delavayi* var. *leiocarpum* Finet et Gagnep. 归入苍山乌头中,但从前者的模式 Delavay 1041 来看,其小苞片线形,花序轴有开展毛,该变种应并入 *A. delavayi* 中。在大理苍山花甸坝,*A. delavayi* 和苍山乌头都有分布,Delavay 于同一天采到这两个种并不奇怪。

A. episcopale Lévl. 是根据采自滇东北的标本(E. E. Maire 433)发表的。我们检查了这号标本,发现其在体态和叶形上与紫乌头没有区别,但花梗被卷曲毛,心皮无毛。在贵州威宁(钟补勤 1835, PE),四川的泸定(王文采和关克俭,1811,故文光和何铸 11546,PE)等地也有这样的植物存在。王文采教授(1965)曾将这类植物作为黄草乌的一个变种——细裂黄草乌 *A. vilmorinianum* var. *altifidum* W. T. Wang 发表。但他(1993)又将这些植物改定为 *A. episcopale* Lévl. 。我认为这是比较适宜的。这类植物与黄草乌在叶的分裂程度上易于区别。很有趣的是,我在丽江玉龙山云杉坪采到了与上述标本极相似的植物(杨亲二 8933),但心皮数目多达6~8个。

产于四川西部(木里、松潘等地)的弯喙乌头 *A. campylorhynchum* Hand.-Mazz.(花梗被卷曲毛)与 *A. episcopale* Lévl. 是极难区别的。因为我对两者在上萼片的喙的长短上缺少变异幅度的研究,在本文中我暂未将二者合并。

产于我国的一些叶全裂的藤本类的乌头如黄草乌 *A. vilmorinianum* Kom(分布于云南中部、西部,贵州南部)、紫乌头 *A. delavayi* Franch. 、主教乌头 *A. episcopale* Lévl.、弯喙乌头 *A. campylorhychum* Hand.-Mazz. 、土官村乌头 *A. tuguangcunense* Q. E. Yang、玉龙乌头 *A. stapfianum* Hand.-Mazz. 、松潘乌头 *A. sungpanense* Hand.-Mazz.(分布于四川北部、青海东部、甘肃南部、宁夏南部、陕西南部及山西南部,秦岭乌头 *A. liouii* W. T. Wang 实际上与其没有区别,宜归并)以及川鄂乌头 *A. henryi* Pritz. 等种类在地理上虽彼此有一定隔离,但在有些地区是重叠的。在植物形态上,它们之间常常是可以分开的,但有一些中间类型极难鉴定。它们可能是一些地理上互相替代的类群。关于它们的最适宜的分类处理,有待于进一步的深入研究。

鉴于 *A. delavayi* Franch., *A. episcopale* Lévl. 在名实上的长期混乱,特重申如下:*A. episcopale* Lévl. 和 *A. delavayi* Franch. 是不同的植物。它们的主要区别在于前者花梗的毛通常卷曲贴伏,心皮无毛,而后者花梗的毛直立伸展,心皮通常有毛。《中国植物志》27卷记载的 *A. episcopale* Lévl. 乃是 *A. delavayi* Franch.(四川植物除外),其中记载的马耳山乌头只是 *A. delavayi* 的一个极端变异类型(直立草本)。

The taxonomy of this species has long been in great confusion. For the convenience of discussion, the question will be reviewed chronologically.

Franchet (1888) described *A. delavayi* from a gathering from Eryuan, Delavay 1850. In his Latin description he stated that his new species has slender and flexible stem (Caulis gracilis flexosus), but the three plant individuals on the type sheet give one a strong impression that this species is an erect herb.

Finet & Gagnepain (1904) described a variety under this species, i. e. *A. delavayi* var. *leiocarpum*, based on the gathering Delavay 1041 from Mt. Cangshan, Dali. As indicated by the name, this variety has glabrous carpels. It should be noted that this plant has typical climbing stem.

Basically, Handel-Mazzetti (1939) followed the above authors in his treatment, but reduced *A. episcopale*, a species described by Léveillé from a Maire gathering, E. E. Maire 433, most probably from Qiaojiao, northeastern Yunnan, to the synonym of *A. delavayi*, and at the same time he cited four specimens from Sichuan. It should be pointed out that it is Handel-Mazzetti's treatment that has resulted in the later long-term confusion of the taxonomy of *A. delavayi*.

Fletcher & Lauener (1950) basically agreed with Handel-Mazzetti's treatment, but they reduced *A. episcopale* to *A. delavayi* var. *leiocarpum* Finet et Gagnep. as a synonym based on the fact that the former has also glabrous carpels. Under *A. delavayi* and *A. delavayi* var. *leiocarpum*, they did not cite any specimens from Sichuan.

Professor W. T. Wang (1979) had very different opinion from the authors mentioned above. He pointed out correctly that *A. delavayi* and *A. episcopale* are two independent species, but unfortunately his concept of the two species is erroneous in the light of not only their morphological delimitation but also their geographical distribution. He considered that both species have the pedicels covered with spreading hairs and the flowers with the same structure, and thus should be closely related to each other, but the former has erect stem and is restricted to Mt. Maershan, Heqing, in distribution, whereas the latter has climbing stem and is distributed in northwestern Yunnan and southwestern Sichuan. In 1993, Professor W. T. Wang found his concept of *A. episcopale* is wrong (he considered this species has pedicels covered with spreading hairs; in fact, the pedicels are covered with curled hairs. See below for the detail), and thus made a taxonomic revision of this species (W. T. Wang, 1993). Nevertheless, he still insisted that *A. delavayi* should only include the plants with the erect stem, and considered that the plants with the climbing stem, which were referred to as *A. episcopale* by him, actually represent a new taxon. This new taxon, in Professor W. T. Wang's view, is very similar to *A. episcopale*, from which it is only different by having pedicels covered with spreading hairs, and should be therefore described as a variety, i.e. *A. episcopale* var. *villosulipes*. At the same time, he considered that the type of *A. delavayi* var. *leiocarpum*, Delavay 1041, has no difference from *A. contortum*, and thus reduced *A. delavayi* var. *leiocarpum* to the synonym of *A. contortum*.

It should be admitted that, as I have mentioned above, the type specimen of *A. delavayi* really gives one a strong impression that it is an erect herb. I examined many specimens and made an intensive field investigation in Dali and Heqing, and found that this species is by no means restricted to Mt. Maershan in distribution but relatively widely distributed in northwestern and northeastern Yunnan, growing usually in bushes and having climbing stems in most cases. The type may only represent an extreme form in the stem habit. The two R. C. Ching gatherings from Heqing, 25574 and 25557, have stems erect in the lower part but obviously flexible in the upper part. The W. T. Wang gathering from the

same area, 337, consists of three plant individuals, one of which looks very like an erect plant (from which the figure of *A. delavayi* in Flora Reipublicae Popularis Sinicae, vol. 27, was drawn), but the remaining two look very like climbing plants. These three plants, according to the field record, grow in the meadow at an altitude of about 3700 m in Mt. Maershan, whereas in this mountain the climbing plants of this species, according to my observation, usually occur in bushes below an altitude of 2700 m. I made several field investigation in the place where those three plants were collected, but found neither erect plants nor climbing ones, making me more strongly believe that the erect plants do only represent an extreme type. The species represented by such extreme variation type is only the so-called " paper species". In fact, the habit of the stem in some species of the genus *Aconitum* is easily affected by habitats and highly variable. The species *A. tsaii*, *A. geniculatum*, and more conspicuously, *A. contortum*, all include both erect and climbing types of plants.

Hence, although I agree with Professor W. T. Wang that *A. delavayi* is an independent species, I do not think that this species is restricted to Mt. Maershan in distribution and has only erect stems. On the contrary, I believe that it is a relatively widely distributed species and usually has climbing stems. The plants referred to as *A. episcopale* Lévl. by Professor W. T. Wang in Flora Reipublicae Popularis Sinicae, vol. 27 should be mostly identified as *A. delavayi*.

A. delavayi is easily distinguished from its allies by having spreading hairs covering the inflorescence axis and the pedicels, and by having the higher galeate upper sepals. The indumentum of the pedicels and of the carpels, however, exhibits some variation within and between populations, though the indumentum of the pedicel is one of the most constant and reliable diagnostic features in most of the species of *Aconitum*. At Huadianba, Mt. Cangshan, Dali, I found that the plants of *A. delavayi* usually have spreading hairs on the inflorescence axis, the pedicels and the carpels, but sometimes the plants have spreading hairs only on the inflorescence axis, with the pedicels and the carpels being glabrous, and in some cases the plants have spreading hairs on the inflorescence axis and the pedicels, with only the carpels being glabrous (Q. E. Yang 9404, PE). The S. K. Wu 9055 gathering from Lanping includes two plants, one of which has glabrous pedicels and carpels. A gathering from Heqing, Coll. Team 701 73004, has glabrous pedicels but sparsely hairy carpels, whereas the other gatherings from this area have spreading hairs on the pedicels and carpels. Considering the great variation of the indumentum of the carpels in this species, *A. delavayi* var. *leiocarpum* Finet et Gagnep. should be reduced to synonym. It is unacceptable that Professor W. T. Wang combined it with *A. contortum*, since the type of this variety, Delavay 1041, has linear bracteoles and spreading hairs on the inflorescence axis, two features which are usually found present in *A. delavayi*, but never in *A. contortum*. The species *A. contortum* always has glabrous inflorescence axis, glabrous pedicels and carpels, and broader spathulate bracteoles, by which it is easily distinguishable from *A. delavayi*. Professor W. T. Wang (1993) mentioned that Delavay 1040, the type of *A. contortum*, and Delavay 1041, the type of *A. delavayi* var. *leiocarpum*, were both collected on the same day from Mt. Cangshan, Dali, which, I guess, though he did not note it explicitly, might be one of

the factors leading him to believe that they belong to the same plant and thus to reduce the latter to the former as synonym. At Huadianba, Mt. Cangshan, I found *A. delavayi*, the so-called *A. delavayi* var. *leiocarpum* and *A. contortum* to grow in very near places, though in somewhat different habitats. So it is not surprising that Delavay could collect them on the same day.

A. episcopale Lévl. was described from a Maire gathering, E. E. Maire 433, from northeastern Yunnan. This species can be distinctly distinguished from *A. delavayi* by having the relatively sparse curled hairs covering the pedicels and having the glabrous carpels. Some plants from Guizhou's Weining (P. C. Tsoong 1835) and Sichuan's Luding (W. T. Wang & K. C. Guan 1811, W. K. Hu & Z. He 11546) are also referable to this species, though they were treated as *A. vilmorinianum* var. *leiocarpum* W. T. Wang (1965). Professor W. T. Wang is right when he (1993) identified them as *A. episcopale* Lévl. These plants are different from *A. vilmorinianum* in the degree of leaf division. Most interestingly, from Yunsaping, Mt. Yulongshan, Lijiang, I collected a plant (Q. E. Yang 8933) very similar to *A. episcopale* in general facies but different by having 6～8 carpels, which I once considered might represent a separate species.

The species *A. campylorhynchum*, which is distributed in western Sichuan, is so similar to *A. episcopale* in having curled hairs covering the pedicels that it is extremely difficult to differ them. They are different only in that the former has long-beaked upper sepals. As I have no idea about the variation range of the length of the beak, I have to treat them as two separate species for the time being.

It merits mentioning that the climbing species with trisect leaves of *Aconitum* in China, such as *A. vilmorinianum* Kom. distributed in central and western Yunnan, and southern Guizhou, *A. delavayi* Franch. in northwestern and northeastern Yunnan, *A. episcopale* Lévl. in northeastern and northwestern Yunnan, southern Guizhou and southwestern Sichuan, *A. campylorhynchum* Hand.-Mazz. in western Sichuan, *A. tuguancunense* Q. E. Yang in northwestern Yunnan, *A. stapfianum* Hand.-Mazz. in northwestern Yunnan, *A. sungpanense* Hand.-Mazz. in northern Sichuan, eastern Qinhai, southen Gansu, southern Ningxia, southern Shaanxi and southern Shanxi (*A. liouii* W. T. Wang should be reduced as its synonym) and *A. henryi* Pritz. in eastern Sichuan and western Hubei, are usually more or less isolated in distribution, but sometimes are sympatric. Morphologically they are usually distinguishable from each other but between them there are often intermediate types which are very difficult to identify with certainty. These species may have formed the so-called geographical vicarious relationships. As is well known, such vicarious taxa are often taxonomically very difficult to treat. Further studies are needed for a better understanding of their relationships and a more satisfactory taxonomic treatment.

22.　西南乌头

A. episcopale Lévl. in Rep. Sp. Nov. 13: 341. 1914; W. T. Wang in Fl. Reip. Pop. Sin. 27: 248. 1979, p. p., excl. Pl. Yunnan. TYPE: China. Qiaojia (?), NE Yunnan, E. E. Maire 433 (holotype, E).

A. vilmorinianum var. *altifidum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 82. 1965 et in Fl. Reip. Pop. Sin. 27: 247. 1979. TYPE: China. Weining, Guizhou, P. C. Tsoong 1835 (holotype, PE).

A. wangii Q. E. Yang in Cathaya 5: 103. 1993, nom. nud.

Distribution: Yunnan, Sichuan and Guizhou.

Yunnan: NE Yunnan (Qiaojia?), E. E. Maire 433 (E); Lijiang, G. Y. Gao & P. Tan (谭沛) 014 (PE), Q. E. Yang 8933. **Sichuan**: Luding, W. T. Wang & K. C. Guan 1811, W. K. Hu (胡文光) & Z. He 11546 (PE), W. K. Hu 35440 (PE). **Guizhou**: Weining (威宁), P. C. Tsoong (钟补勤) 1835 (PE), M. L. Sai (赛明兰) 80001 (PE).

For the detail on the relationships of this species with its allies see the discussion under *A. delavayi* Franch.

23. 德钦乌头

A. ouvrardianum Hand.-Mazz. Symb. Sin. 7: 285, t. 5, f. 9. 1931 et in Acta Hort. Gotob. 13: 108. 1939; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 85. 1965; Hsiao et W. T. Wang in Acta Pharm Sin. 12: 691, pl. 6, f. A. 1965; W. T. Wang in Fl. Reip. Pop. Sin. 27: 294, pl. 62, f. 12. pl. 63, f. 6~8, 1979. TYPE: China. Deqen, Yunnan, Handel-Mazzetti 9702 (isotype, K; photo, PE).

A. sinonapelloides var. *weisiense* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 87, pl. 5, f. 20. 1965 et in Fl. Reip. Pop. Sin. 27: 298. 1979, syn. nov. TYPE: China. Weixi, Yunnan, C. W. Wang 64595 (holotype, PE).

A. brevipetalum W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 88, pl. 5, f. 19. 1965 et in Fl. Reip. Pop. Sin. 27: 298, pl. 68, f. 1~3. 1979, syn. nov. TYPE: China. Weixi, Yunnan, T. T. Yu 8940 (holotype, PE; isotype, KUN).

A. tenuicaule W. T. Wang in Fl. Reip. Pop. Sin. 27, Addenda. 1979, syn. nov. TYPE: China. Deqen, Yunnan, J. S. Yang 8646 (holotype, PE).

A. benzilanense T. L. Ming in Acta Bot. Yunnan. 7: 305, f. 3. 1985. syn. nov. TYPE: China. Deqen, Yunnan, Z. Nan 84-02 (holotype, KUN).

A. ouvrardianum var. *pilopes* W. T. Wang et L. Q. Li in Acta Phytotax. Sin. 25: 32, pl. 3: 2. 1987, syn. nov. TYPE: China. Zhongdian, Yunnan, J. S. Yang 84-913 (holotype, PE).

A. tongolense var. *patentipilum* Q. E. Yang et Z. D. Fang in Acta Bot. Yunnan. 12: 391. 1990, syn. nov. TYPE: China. Weixi, Yunnan, Z. D. Fang 0320 (holotype, KUN).

A. kagerpuense W. T. Wang in Acta Phytotax. Sin. 31: 206. 1993, syn. nov. TYPE: China. Deqen, Yunnan, G. Forrest 14652 (holotype, E).

A. baicalense auct non Rapaics: Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 198. 1950.

Distribution: NW Yunnan.

Yunnan: Deqen, Handel-Mazzetti 9702 (photo, PE), G. Forrest 14652 (E), 19999 (E), C. W. Wang 64787 (PE), 64973, 69517, T. T. Yu 7813 (PE), 9352, K. M.

Feng 6011, 6184, 64973 (PE), J. S. Yang 8958, 8855, 8646, Z. Nan 84-02, Q. E. Yang 8917, 8923, Z. D. Fang 1735, 1736, 1624, 1737; Zhongdian, J. S. Yang 8054, 84-913 (PE); Weixi, C. W. Wang 64595 (PE), T. T. Yu 8940 (PE; KUN), Z. D. Fang 0320。

本种在花序的长短、分枝的多少、植株的高矮、心皮毛被的有无乃至于花梗毛被的卷曲与开展等方面表现出较大的居群间和居群内变化。不宜以这些性状来划分种或种下分类群。

上引方震东 1735,1736,1624 和 1737 号标本（每号约有 10 个植株）均采自德钦雨崩太子雪山。其中 1735 号标本采自海拔 3600 m 一带放牧草地灌丛中,1736 号采自这一带的冷杉林下,1624 号标本采自海拔 3900 m 一带高山草甸,1737 号标本采自 4100 m 一带高山草甸。这些植物在叶的分裂程度和心皮毛被上表现出一定的差异,特别是叶的分裂有明显的垂直梯度上的变异。其中 1735 和 1624 号标本心皮明显有毛。1736 号和 1737 号标本心皮无毛。1735 和 1736 号标本叶分裂至距基部约 2 cm,1624 号标本叶裂至距基部约 1.5～1 cm,1737 号标本的植株叶是全裂的。

This species exhibits some variations within and between populations in the degree of leaf division, the length of the inflorescence, the number of the branches, the height of plants, the hairiness of carpels and the type of the indumentum of the pedicels. Taxa described based on these characters cannot be accepted.

The four Z. D. Fang gatherings cited above, 1735, 1736, 1624 and 1737, each including about ten plant individuals, were all collected from Mt. Taizhixueshan, Deqen but from different habitats or altitudinal zones. The number 1735 was collected from the grazing meadow and bushes at an altitude of 3600 m, the number 1736 was from the forest at the same altitude, the number 1624 was from the alpine meadow at an altitude of 3900 m and the number 1737 was from the alpine meadow at an altitude of 4100 m. These plants exhibit some variations in the degree of the leaf division and the hairiness of the carpels. The degree of the leaf division shows obvious clinal altidudinal variation. No. 1735 and No. 1624 have hairy carpels, whereas No. 1735 and No. 1624 have glabrous carpels; No. 1735 and No. 1736 have leaves deeply divided to about 2 cm from the base, and No. 1624 has leaves deeply divided to 1.5～1 cm from the base, whereas No. 1737 has leaves totally divided to the base (trisect).

24. 东俄洛乌头

A. tongolense Ulbr. in Rep. Sp. Nov. 14: 299. 1915; Hand.-Mazz. in Acta Hort. Gotob. 13: 95. 1939; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 85. 1965 et in Fl. Reip. Pop. Sin. 27: 305, pl. 70, f. 1～4. 1979. TYPE: China. Tongolo, Sichuan, J. A. Soulie 2395 (holotype, P).

A. chenianum W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 89, pl. 6, f. 22. 1965. TYPE: China. Daocheng, Sichuan, T. T. Yu 12824 (holotype, PE; isotype, KUN).

A. bracteolosum W. T. Wang in Fl. Reip. Pop. Sin. 27, Addenda., 1979, syn. nov. TYPE: China. Zhongdian, Yunnan, J. S. Yang 8119 (holotype, PE).

A. gezaënse W. T. Wang et L. Q. Li in Acta Phytotax. Sin. 25: 31, pl. 3: 1. 1987, syn. nov. TYPE: China. Zhongdian, Yunnan, J. S. Yang 83-396 (holotype, PE).

A. kongboense var. *polycarpum* W. T. Wang in Acta Phytotax. Sin. 25: 33. 1987, syn. nov. TYPE: China. Zhongdian, Yunnan, J. S. Yang 83-407 (holotype, PE).

Distribution: NW Yunnan and SW Sichuan.

Yunnan: Zhongdian, J. S. Yang 8333, 8119, 83-396 (PE), 83-407 (PE), 88-136 (PE), 88-179 (PE). **Sichuan**: Batang (巴塘), Anonymous 628 (PE), 1633 (PE); Daocheng, T. T. Yu 12824 (PE; KUN), Sichuan Veg. Exped 2184, 2187, 1938, 3778, 3880, Qinghai-Xizang Exped. 5451; Xiangcheng, Sichuan Veget. Exped. 3128, Qinghai-Xizang Exped. 003846, 004863; Derong (得荣), Qinghai-Xizang Exped. 003438.

在本种,茎有无细分枝可能是没有分类意义的。上引俞德浚 12824 号标本有两个植株,一个无分枝,一个有细分枝,与所谓的具细分枝的格咱乌头 *A. gezaënse* W. T. Wang et L. Q. Li 无异。

In this species, the presence or absence of slender branches is of no taxonomic value. The T. T. Yu 12824 gathering cited above includes two individuals, one of which is unbranched whereas the other has several slender branches and thus has no essential difference from *A. gezaënse* W. T. Wang et L. Q. Li, which was claimed to have several slender branches.

25. 短柄乌头

A. brachypodum Diels in Not. Bot. Gard. Edinb. 5: 268. 1912; Hand.-Mazz. Symb. Sin. 7: 288. 1931 et in Acta Hort. Gotob. 13: 88. 1939; Fletcher et Lauener in Not. Bot. Gard. Edinb. 20: 199. 1950; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1: 97. 1965; Hsiao et W. T. Wang in Acta Pharm. Sin. 12: 690. 1965; W. T. Wang in Fl. Reip. Pop. Sin. 27: 313, pl. 73, f. 4~6. pl. 74. f. 5~6. 1979. TYPE: China. Lijiang, Yunnan, G. Forrest 28565 (holotype, E).

A. huizenense T. L. Ming in Acta Bot. Yunnan. 7: 301, f. 1. 1985, syn. nov. TYPE: China. Huize, Yunnan, Y. Q. Liu 81-01 (holotype, KUN).

Distribution: NW Yunnan, NE Yunnan and SW Sichuan.

Yunnan: west, no precise locality (Lijiang?), G. Forrest 28565 (PE), 30665 (PE), 30670 (PE); Lijiang, G. Forrest 3044 (E), R. C. Ching 30721 (PE), 31052 (PE), T. T. Yu 15578 (PE), C. Y. Wu & D. Y. Liu 21335, W. T. Wang 166, Z. W. Lu s.n., S. W. Yu s.n., Q. E. Yang 8937; Huize, Y. Q. Liu 81-01; Qiaojia, S. Z. Yang s.n. **Sichuan**: Yanbian (盐边), T. T. Yu 1706 (PE), 1707 (PE); Muli, S. K. Wu 2714, Qinghai-Xizang Exped. 14262.

"会泽乌头 *A. huizenense* T. L. Ming"从其模式标本记录签来看,系根据一栽培植株发表的。其花的结构与短柄乌头没有明显区别,块根的形状尤其相似。花序形状确实不同,但这种变化乃是因为移栽而引起的。我从云南中甸把短柄乌头的近缘种铁棒锤 *A. pendulum* Busch (两者主要在花梗毛被上有别) 移栽到昆明植物研究所,发现其体态及花序的形状发生了很大变化: 茎纤细,仅有 3 朵花,花梗长而似分枝,小苞片叶状,与

"会泽乌头"除花梗毛被不同外，极为相似。(凭证标本杨亲二 9001)。如果不是我自已亲自移栽和随时观察，我可能很难正确鉴定这样的栽培变化类型，不免会将这种类型发表为新种，甚至可能将这样的"新种"放在离这个种本身很远的系统位置上。这一方面说明栽培观察在植物分类学中的重要性，另一方面也说明，在对象乌头属这样的变异极为复杂的类群进行分类时，对性状要仔细分析，要尽量利用那些有遗传稳定性的性状，不要轻易把一些显得奇怪的变异类型发表为新种。

A. huizense T. L. Ming was described from a cultivated plant. The structure of its flowers has no difference from that of *A. brachypodum* Diels. Their tubers are extremely similar in shape. The difference of the appearance of their inflorescence was most possibly caused with transplanting. When I transplanted *A. pendulum* Busch, a species very similar to *A. brachypodum* in all other characters except for the flower size and the indumentum of the pedicels, from Zhongdian to the Botanic Garden of Kunming Institute of Botany, I found that its general facies and the shape of the inflorescence had changed greatly, the stem becoming very slender, bearing only three flowers with long pedicels, and the bracteoles becoming leaf-like. This plant has no other difference from *A. huizense* except for that in the indumentum of the pedicels. I admit that if the plant had not been transplanted by myself and always under careful observation, I might have also recognized it as a new species and even compared it with some distantly related species. This example, on the one hand, explains the reason why transplant experiment is so important in taxonomic research, and, on the other hand, it gives us also a warning that in the taxonomic treatment of *Aconitum*, a genus which is morphologically so highly variable, we should always carefully analyze the variation pattern of all the characters and use only those genetically constant characters for classification. Only by doing so can one avoid describing those extremes in variation as new taxa.

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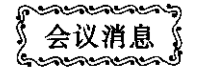
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第14届国际生物多样性及进化生物学研讨会在德国召开

1999年9月5~11日,在德国的东部城市耶拿(Jena)召开了由德国植物学会(The German Botanical Society)主办的第14届国际生物多样性及进化生物学研讨会(14. International Symposium ——Biodiversity & Evolutionary Biology)。

今年也正值德国思想家、文学家、政治家、收藏家兼植物学家歌德(J. W. Goethe)诞辰200周年,因而这一盛会具有特殊的意义。因为耶拿不仅是德国大文豪席勒(F. Schiller)及著名光学仪器制造商蔡斯(C. Zeiss)的故乡,也曾是歌德生活过多年的地方。

来自德国、美国、英国等32个国家的250多名植物学者参加了这一盛会。我趁在德国美茵兹大学(University of Mainz)留学的机会,作为中国的唯一代表参加了这一研讨会。与会的代表中除了德国植物学界的著名学者,如P. Leins (University of Heidelberg), G. Wagenitz (University of Goettingen), H. J. Schweitzer (University of Bonn), K. Bachmann (University of Gatersleben), S. R. Gradstein (University of Goettingen)等以外,还有国际知名的英国学者V. H. Heywood (University of Reading), S. Blackmore (Natural History Museum London),奥地利学者T. Stuessy (University of Vienna),美国学者B. Mishler (University of California, Berkerley), K. W. Hilu (Virginia PolytechnicInstitute & State University),瑞典学者E.-M. Friis(Naturhistorisches Reichmuseum, Stockholm)等等。因故不能赴会的德国美茵兹大学的Joachim W. Kadereit教授也派出最强阵容参加研讨会。

大会期间有113人各作了20~30分钟的报告,其中约一半的人是用英语作的报告,另一半的人则是用德语。此外还有约220个墙报展出,并在9月9日进行了3个专题(苔藓,菊科,物种生物学)的分组讨论。向会议提交的论文所涉及的研究对象包括从藻类,苔藓,蕨类到种子植物的许多类群。既有对大类群的系统分析,也有对种下居群的深入研究。所涉及的研究领域则涵盖生物多样性及进化生物学研究的各个方面。值得注意的是,近一半的论文涉及分子水平的研究。可见分子生物学方法在当今生物多样性及进化生物学研究中的重要地位。

会议期间还组织与会者去歌德、席勒的故居和被评为1999年度欧洲文化城的魏玛(Weimar)及世界上最大的标本馆之一 Herbarium Haussknecht (Jena, Germany)参观,并进行了野外考察活动。

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